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ABSTRACT

This document is a resource guide for educators on using telecommunications in the classroom. The first chapter provides a brief history of telecommunications, describes what telecommunications is, and discusses its value in the classroom today. The second chapter discusses the parts of a telecommunications system and provides technical information, including the technical vocabulary needed to use telecommunications. The third section provides lesson plans for using telecommunications in the classroom. The plans were written by classroom teachers across the United States and Canada and selected as exemplary plans from entries received in the Computer Learning Month/ICCE 1988 Telecommunications Lesson Plan Contest. Each plan consists of a one-page summary of strategies for using computers and software in the classroom and includes the title, author, major objectives, grade level, materials checklist, time required, prerequisite student skills, activities and procedures, follow-up activities, and additional notes. The lesson plans include introductory lessons on telecommunications as well as language arts, mathematics/science, social studies, online research, and student dream projects. A chart is provided to aid in locating lessons by subject area and grade level. The final chapter lists telecommunications services and resources currently available, and a glossary of terms and an index are provided. (11 references) (DB)

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# Telecommunications in the Classroom

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# Telecommunications in the Classroom

Text written by Chris Clark, Barbara Kurshan, and Sharon Yoder
Edited by Neal Strudler and Sally Bowman

Lesson Plans written by U.S. and Canadian teachers and
Selected from the Computer Learning Month/ICCE
1988 Telecommunications Lesson Plan Contest Entries
Edited by Michael Chertok , Beverly Corbett, and Sally Bowman

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# About this Book

The vast majority of school systems in the United States and Canada currently use computers. Educators across North America have shown much enthusiasm and creativity in planning for their use in the classroom. The use of telecommunications software, services and capabilities provide new opportunities for educators and for students.

*Telecommunications in the Classroom* is co-published by the International Society for Technology in Education (ISTE) and the Computer Learning Foundation.® These two organizations joined forces to develop a complete resource guide for educators on using telecommunications in the classroom. *Telecommunications in the Classroom* provides you with both the information and lesson plans to help you get started using telecommunications in your classroom today.

The first chapter provides a brief history of telecommunications, what telecommunications is and its value in the classroom today. In order to use telecommunications, it is advantageous to understand some technical vocabulary. Thus, the second chapter discusses the parts of a telecommunications system and also provides the technical information you may need or want to know.

The third section includes lesson plans for using telecommunications in your classroom. These lesson plans were developed by educators throughout the United States and Canada and were selected from the best entries received in the Computer Learning Month/ICCE 1988 Telecommunications Lesson Plan Contest. The lesson plans are divided into major content areas. At the end of the lesson plan section is a chart to assist you in locating lesson plans by subject area and grade level.

Following the lesson plan section is a chapter with descriptions of many of the telecommunications services available today, followed by a glossary of terms.

This book is dedicated to the many teachers who are venturing out on their own to expand their knowledge of the new technology tools to assist them in teaching our children. By exploring the value and use of telecommunications in your classroom, *you won't believe what you'll achieve!* And by introducing telecommunications to children in your classroom, *you won't believe what they'll achieve!*

**The International Society for Technology in Education (ISTE)**, formerly the International Council for Computers in Education (ICCE), is the largest non-profit professional membership organization in the world serving technology using educators. ISTE is dedicated to the improvement of education through the use and integration of technology. ISTE is the publisher of *The Computing Teacher* journal featuring articles and columns on telecommunications, computers in the classroom, and other educational uses of technology. ISTE also supports SIGTel, a *Special Interest Group* formed to promote telecommunications as a tool for enhancement of learning and the delivery of instruction. ISTE offers many services to assist and support people using technology to enhance education. They include periodicals, books and courseware , *Special Interest Groups*, graduate level *Independent Study* courses, professional committees, and the Private Sector Council.

For more information about membership in ISTE and the services it provides, contact:

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**The Computer Learning Foundation** is a non-profit educational foundation serving the United States and Canada. Its goal is to increase the number of people receiving the benefits of technology. The Foundation's programs focus on helping parents and teachers gain the information they need to use technology effectively and to develop computer competency among their children. Computer Learning Foundation books and materials are available all year long; however, new materials are released each year as part of the celebration of Computer Learning Month. Celebrated each October, Computer Learning Month is an opportunity for parents, educators, business people, students, software publishers, computer manufacturers and retailers to cooperatively explore and share with others the potential of computers and software in their lives -- at home, at work and at school.

Other lesson plan books available from the Computer Learning Foundation include:

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# Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom

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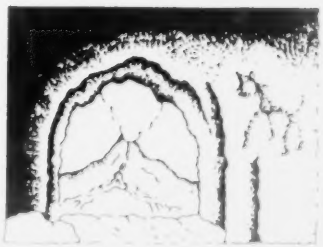
# Introduction

Human beings have an almost insatiable need to communicate. The history of the human race has come to us via paintings and stone tablets; via scrolls and books. The available modes of communication shaped the world of ancient man just as our communication channels shape our society today. Today's world would be a very different place without modern communication media. We use spoken language and telephones; we write and use books; we receive information from radio and television; we use the computer for telecommunications. Every moment of our lives we take for granted the availability of a multitude of ways to interact with the others on our planet.

Throughout human history, people seem to have been driven towards better, faster, and more efficient ways to communicate. Telecommunications via computers is merely a new way of communicating quickly and efficiently. Before discussing telecommunications today and its value both to teachers as individuals and its value in the classroom, take a moment to examine the modes of communication that have profoundly affected our history.

## A Brief History of Communication

Even today we are moved by the communications modes of primitive man. Ancient cave paintings and early statues evoke emotions from a world strange to us. These early artists communicated with their peers and continue to communicate with us about their world.



We know little of what the earliest spoken languages might have sounded like, but these languages clearly provided a mode of communication for early man. The sounds these primitive humans made allowed them to develop a social fabric that undoubtedly was a factor in the move from nomadic hunter to more stable primitive farmer and eventually to builder of cities and cultures. Language became a necessary skill for survival and advancement in these early societies.

Language provided more than day to day communication among individuals. It also allowed detailed knowledge to be passed from generation to generation. We know that many early cultures had a strong oral tradition. Information was passed from parent to child by specialists who memorized the history of the tribe from their elders. These chosen carriers of oral tradition no doubt apprenticed for many years to develop their art. Through the storytelling by these verbal experts, thorough and accurate historical and cultural information was available to all members of the tribe.

As man continued to evolve and his world became more complex, cave paintings, marks on walls, and notches in sticks gradually evolved into written language. With written language, man could communicate more easily across time and space and among a larger number of people. As the social fabric of the community became more complex and the amount of information that had to be transmitted from generation to generation increased, so the need for written language grew. Writing, first on stone or clay tablets and on skins or bark, gradually became a part of more advanced cultures. From scrolls containing Egyptian hieroglyphics and Greek mathematics to books as we know them, written language became a way of preserving and transmitting culture; a way for people to communicate with each other as well as with the future.

But the use of written language was not a universal skill. There were only a few specialists who could read and write. For an extensive period of human history, reading and writing was the province of a privileged few. Books were hand copied one at a time and were available only to the rich. A great deal of study was needed to master reading and writing. Such education was not available to the masses.

With the coming of the printing press, books became more generally available and learning to read more universally valuable. But reading and writing were still somewhat specialized skills. Education still focused on memorization rather than the ability to find information in books. Only in fairly recent times have reading and writing been considered necessary for an individual to function as a full member of society.

In the 1800's as reading and writing were becoming increasingly essential, there were other developments that allowed an increase in speed and distance of communication. In the mid 1800's the invention of the telegraph allowed messages to be sent almost instantly across long distances. No longer did one have to wait for a letter to be carried across time and space to communicate with someone many miles away. Suddenly the world was a smaller place. Like reading and writing, this new method of communication was initially accessible to only a few specialists. Only those trained in the operation of the equipment and methods of transmission could use the telegraph.

Later that same century came the invention of the telephone. The telephone, a more user-friendly method of communication, required less training and was more easily useable by the general public. Even so, it took many years until the telephone was generally accepted. Only in the last 50 years has the telephone become an almost essential element in every home and office. Without the telephone, society as we know it would cease to function.

The telephone is so much a part of our society that every child learns to use it with ease. While our great grand parents would have been overwhelmed by the complexity of the modern telephone, very young children are completely unintimidated by this technology. In fact, learning to use the telephone is part of growing up in our society. The telephone allows access to almost anyone in the world.

In our century, the number of modes of communication has greatly expanded as we have increasingly moved into an information age. In our homes, radio and television close time and cultural gaps. News is instantly sped around the world. Pictures of national successes and world disasters flash on screens moments after they occur. The modern office is full of communication technology. Complex phone systems record messages and automatically forward calls. Facsimile or "FAX" machines allow instant transmission of documents across the globe. Teleconferencing allows individuals in diverse geographical settings to meet without leaving their offices. Without these modes of communication, our world would be a very different place.

For hundreds of years we have preserved our culture using books. Books contained our history and our literature. They allowed us to communicate about the past and with the future. Recent technological advances have given us yet other ways to preserve and disseminate elements of our culture. We can use videotape to record a dance. We can use videodiscs to see events in history. We can use CD-ROM technology to search the vast amounts of human knowledge without going to a large library or learning center. Much of this new communication technology is tied to the microcomputer. Like the coming of the telephone, the microcomputer has led us towards a revolution in the way in which our society communicates.

Telecommunications, the electronic exchange of information across distances, is the newest technology-based form of communications between individuals and across the globe. Because it is relatively new, its use lies largely in the hands of a minority of adventurers. Like written language

or the telegraph, it still requires a fair amount of training for an individual to learn to use. However, we see telecommunications rapidly becoming an important part of the technology of the modern office. As telecommunications is used more widely in all facets of our society, more powerful tools will be developed that will make it even easier to learn. Mastering telecommunications will become part of becoming a literate member of society.

Let us imagine, then what it will be like in the future when we find telecommunications to be a part of our every day lives.

### A Classroom Scenario

Sally Miller arrives at school half an hour before her students so that she has time to check her electronic mail before the school day begins. Today, like most other days, she turns on the computer behind her desk and directs her computer system to begin a telecommunication session. Sally then turns around and starts to look over her plans for the day. While Sally fine-tunes today's lessons, her computer will dial a phone number, connect with a larger computer some distance from her classroom, collect her messages on a disk, check on the availability of a specific item in a database that she wants to examine, sign off, and hang up the phone. After a few minutes, a pleasant beep lets Sally know the computer is ready for other tasks.

Sally can now read her mail without being connected to her communication service. First, she finds a message from Bob Smith, her contact person at a local office equipment company, indicating that the date of a planned field trip is fine. She composes a response to Bob. Next, she writes a message to send to Central Office asking that the trip's date be put on the school calendar and arrangements be made for bus transportation.

There's also a message from Geoff Sutherland, a teacher from England that she met at a conference last summer. Geoff would like to set up some electronic communication between his students and Sally's. Geoff's students will be studying America soon, and he thinks the contact would enrich their learning. Sally finds this idea exciting and composes an enthusiastic answer.

The other messages she receives require little special attention: school-related memos sent to all teachers in the district, a reminder of an electronic meeting for elementary teachers next month, and brief messages from friends and colleagues. Finally, she checks the database she directed her computer system to access. Indeed, it contains the information she had hoped to find. It is exactly what her students need for their social studies project next week. She saves the record of the correct procedure for accessing the database so that she can include the information on a handout for her students.

When she is ready to send her replies, Sally instructs the software to connect her to a communications service and send her mail. While the computer system is working, she puts a couple of notices on the blackboard in preparation for the arrival of her students. She hears the computer's soft beep indicating the tasks are complete just as the first student enters the room.

Is this science fiction? Not at all. There are many telecommunications systems now in use which are as friendly and versatile as the one described. Thousands of people check their electronic mail daily. It is as much a part of their lives as checking a home mailbox. Such powerful systems give them access to a world of information that goes far beyond just getting mail.

Unfortunately, making use of many of today's telecommunications systems is not always as simple as described above. If you are just getting started, you may experience some problems and frustrations. However, once you learn your way around, using a computer communication system becomes almost automatic. Do you remember the first time you drove a car? There were so many things to think about; now it's almost automatic. Likewise, telecommunications systems that may

seem overwhelming at first will quickly become quite manageable with practice.

## What is Telecommunications?

Telecommunications refers to the electronic exchange of information at a distance. There are many types of telecommunications. A telecommunications system may employ a variety of machines, media, and modes. We often refer to a telecommunications system by the machines or media used or by the type of information transmitted. The machines that may be involved include radios, telephones, television, telegraph, facsimile machines (fax), and computers. The medium of exchange is usually either invisible radio waves carried through the air or electronic impulses traveling over some kind of transmission lines. The mode or type of information may be sound, text, or pictures.

In education, telecommunications usually means using a personal computer equipped with a modem that is connected to another computer system. These systems usually share information over regular telephone lines. In this book, the term telecommunications will refer to this more limited type of system.

## Components of a Telecommunications System

Telecommunications systems in schools range from simple "machine to machine" connections between two computers to connection over phone lines with large and powerful computer systems, usually called mainframes. However, all of these types of telecommunications systems have the same components.

First, there must be a terminal. This machine, often a microcomputer in a school setting, is used to send and receive messages. In addition, there must be communications software that allows your computer to communicate with another computer. A computer alone is not enough to get started. You also need a modem. Often the modem is a separate "box" connected to your terminal or computer, although some computers have built-in modems. The modem prepares the data generated by your communications software so that it can be sent over phone lines to its destination. At the other end of the connection is another modem. This second modem receives the data sent and communicates with the destination terminal.

Components of a Telecommunications System

Each of the components of this system will be discussed in more detail in the following sections of this book.

## What Can You Do with Telecommunications?

There are five major types of communication activities that you may want to use: message exchange, file transfer, conferencing, database searching, and gaming.

1. *Electronic Messaging.* When information is sent to a distant computer and stored there electronically until the receiver calls in to read it, the process is called *messaging*. Private messages are called *electronic mail* or *"e-mail."* Public messages are called *bulletins*. (Students use e-mail and *bulletin boards* to build progressive stories and compile literary magazines.) Inexpensive services have brought students together from all over the world as they worked on writing skills.

2. *Transferring Files.* Using communication software, one computer can be linked to another, to directly exchange data files (for example, word processed documents) and

public domain programs (e.g., games). When you receive a file from an external source, you *download* it.

3. *Live Conferencing*. In live text-based discussions, called *conferences*, many people at a time can take part in a discussion (often with a celebrity of some kind) and send comments back and forth.

4. *Information Gathering*. An incredible amount and variety of data are available to schools through on-line *databases*. Databases can provide bibliographic listings, sources of information, or even complete articles. Librarians have begun to provide access to on-line databases to students working on research papers and other projects.

5. *Gaming and Contests*. Telecommunications can be used to play simulation games between distant classrooms or individuals. There are educational simulation games that have been designed to be played live over phone lines. There are even people who play chess regularly by electronic mail.

### Categories of Communications Services

There are several general categories of communications services.

1. *Electronic Mail Services*. A number of mail-only services are available from telephone companies. They usually charge by the length of messages and you pay only when you send messages. Reading your mail is free.

2. *Database Services*. Phone access to many large databases is becoming increasingly available. Some of these services could previously only be examined on paper. The researcher is typically charged for the amount of time the database is accessed.

3. *Information Services*. These commercial ventures provide e-mail and bulletin boards grouped by interest areas. Often there is a range of other services like weather reports, sports scores, news, and games.

4. *Electronic Bulletin Boards* (BBS). Private citizens, small businesses, clubs, and students all over the country have set up thousands of small bulletin boards. These small services allow members to post bulletins of general interest to the group as a whole.

### Why Learn About Telecommunications?

Long distance data communication technologies bring tremendous potential for growth to schools. For a number of years, educators have been experimenting with a variety of computer communication activities, and recently commercial vendors have been responding to the growing interest in this form of communication with an array of new services, software, and equipment.

As a teacher, telecommunications can open up a new world for you. You will be able to access unbelievable amounts of information from your own computer system with great ease. You will find that you can search databases, consult references, make travel plans and even go shopping on line. You will be able to interact with colleagues from all over the world instantly and at a cost much less than a long distance phone call. Before you know it, you will develop a network of on-line friends with whom you can share ideas and experiences.

Your students, too, will benefit from using telecommunications. Students will be able to access reference material not available in their own school. While they can access information of an amazing variety from all over the world, perhaps the most important benefit to students is the opportunity to interact with other people from different parts of the world. They will learn about other parts of their own country as well as other cultures.

They will be much better prepared citizens in a world that is ever growing smaller - a global village. Furthermore, telecommunications is rapidly becoming a part of all types of work environments. Students who gain experience with telecommunications will be better prepared for the future world of work.

If you have decided to learn about telecommunications, you are among those who are choosing not only to gain access to its many benefits today but also to be better prepared for the future. Because it is relatively new, telecommunications lies largely in the hands of a few, but that is changing rapidly. In the relatively near future using these systems will become as simple as using a telephone or television set today. Today we are at the point where it takes a good bit of knowledge to get started on your own. Keep in mind that there are thousands of people for whom telecommunications is a part of their daily lives, in spite of the sometimes complex hardware and inelegant software. If our students are going to be prepared for our information age society, they need to be exposed to telecommunications in school. Such education begins with a knowledgeable teacher who is willing to learn and grow and can then present this new understanding to his/her students.

# The Telecommunications System

## Telecommunications Hardware and Software

### Overview

In this section you will be introduced to the hardware and software needed for telecommunications. The material here is necessarily technical, providing details and new vocabulary. Don't let yourself become intimidated by the necessity of learning a lot of new vocabulary and concepts. What may seem overwhelming at first quickly becomes natural and easy. You might find it helpful to work through this section with the assistance of a colleague who has some computer communication experience.

Although there is a wide range of computer communication, all telecommunications systems necessarily have four components:

1. a terminal or personal computer,
2. a modem,
3. a telephone line, and
4. communications software.

### Hardware

When you are getting started using telecommunications, you first need to consider what hardware you have available and what you need. There is a large array of possible configurations from which you can choose. If you have worked with microcomputers, you know that one brand of computer cannot always run software written for another; you must have the same or compatible types of computers to share software in a lab, for example. However, nearly any model of computer will work with any brand of modem. Further, it makes no difference what type of computer you will be communicating with. For example, an Apple IIe can use a Hayes modem to communicate with an IBM PC using a Tandy modem.

It is not necessary to purchase all the equipment from one company.

*The Computer or Terminal*

It is not uncommon to find machines called *terminals* in school offices. A terminal is little more than a keyboard, a screen, and a modem, connected by wires or phone lines to a larger computer system located elsewhere. These are usually *dumb terminals*. That is, they are unable to run any programs by themselves. Such terminals are usually dedicated to a special use, such as scheduling, record keeping, or college searches.

When you set up a telecommunications system, you will want a personal computer, not a dumb terminal. Unlike a terminal, a personal computer can also run other educational software. You will most likely want to use the computer for tasks such as word processing, spreadsheet analysis, graphics, or database work in addition to on-line communication.

There is nothing magic about the kind of computer used for telecommunications — nearly any microcomputer will do. Most likely you can use whatever computer systems are already used in your school system. Sometimes an older computer system that is no longer used for regular classroom work can be dedicated to telecommunications, freeing a newer machine for other uses.

Once you have determined which microcomputer you are going to use, you need to find out if your computer has a built-in modem. You will find that most school computers do not.

Check with your computer dealer or the computer specialist in your school system if you are unsure.

If you do not have a built-in modem, your computer needs to have either a modem port or a serial port. Check to see if your computer has a *modem port*. The modem port is the place where you plug in your modem and is usually found on the back of the computer. Sometimes the modem port is marked with a symbol like a picture of a telephone. If you don't have a modem port, check to see if you have a *serial port*. Some computers have two serial ports: one for connecting a printer and one for connecting a modem. Other computers have a parallel printer port for a printer and a serial port for a modem (parallel and serial refer to the way data is sent out of the computer). Again, you can check with your dealer or someone in your school if you have questions about what kinds of ports your computer has.

If your computer does not have a built-in modem or a modem or serial port, you must add a serial interface board or card. This is a circuit board you plug into the computer that adds a serial port to your computer and enables your computer to be connected to a modem. Installing and configuring the board can be tricky, so you will probably want to ask someone well-versed in such technical matters for assistance (such as your computer dealer).

*The Modem*

A *modem* (short for *modulater/demodulater*) translates digital signals (on/off) to and from analog signals (like voices). The translation is necessary because computers only understand digital signals. Telephone lines carry analog signals.

Unless your computer has a built-in modem, you must add one to your system. There are many brands of modems, some made by major computer manufacturers and some by companies that produce only modems. Keep in mind that the brand of computer and modem need not be the same. As with any hardware purchase, be sure that you can easily get your modem serviced. However, since modems have no moving parts, they should rarely need to be repaired.

When modem shopping, you may hear the term *Hayes compatible* or *smartmodem compatible*. The Hayes Smartmodem was one of the first popular personal computer modems. A Hayes compatible modem can send and receive the standard set of instructions used in computer communication. Don't purchase a modem that isn't Hayes compatible.

A second consideration when buying a modem is speed. Advertisements and sales people refer to "300 baud modems" or "9600 baud modems." The word *baud* refers to the speed at which signals are sent and received by the modem. The baud rate is measured in bits per second. A letter or character that you type on your computer keyboard is represented by a byte, which is made up of eight bits (on/off signals.) Thus, a 2400 baud modem can send 2400 bits per second or approximately 300 characters per second:

> 2400 bits per second / 8 bits per byte =
> 300 bytes or characters per second

Thus, a 2400 baud modem can send 300 characters or approximately 50 printed words per second. The common speed for modems as of the writing of this book is 1200 baud, although there are an increasing number of 2400 and 9600 baud modems available. A modem that runs at a higher speed will most likely also run at slower speeds. In general, the faster the modem, the higher the price. However, since many on-line services charge by the minute, you may quickly recover the additional cost of a higher speed modem because of reduced connection time charges. In addition, you need to check to be sure that the phone lines you are using will work with the speed of modem you buy. In some locations, it is difficult to get clear transmission at higher speeds.

To attach your modem to your computer, you will need a cable that connects your modem to the

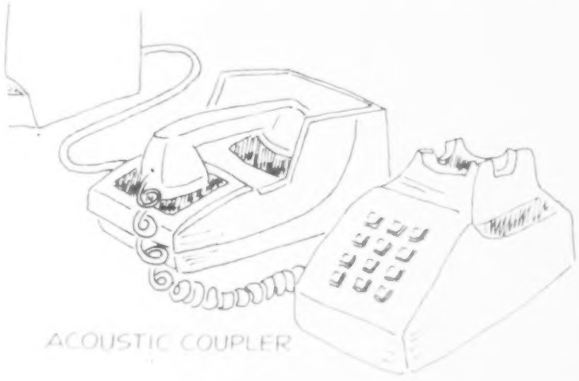
modem or serial port on your computer. There are a wide variety of such cables; their ends have names like DB9, 8 pin DIN, and RS232, and they come in male and female versions. You don't have to learn all of the types of cables. When preparing to set up a system, simply be sure you order the right modem cable. Your dealer should know what kinds of ends are needed. ***Caution***: Printer and modem cables for some computers look exactly alike, but are different internally and may not be interchangeable.

*The Telephone Line*

Once your computer is connected to the modem, you must attach the modem to a telephone line, usually by direct connection. Unhook the modular cord from your phone and plug it into your modem's phone jack (or unplug the phone at the wall and plug the modem's cord into the wall jack.) It can get to be a nuisance doing this every time you want to use the modem, so you may want to purchase a *splitter* that allows two phone wires to go into the same jack, one for the phone and the other for your modem.

Having your phone and modem connected to the same phone line will not affect normal use of your telephone. Your phone will work as usual as long as your modem is off. When you are using your phone line for telecommunications, your phone will be busy to outside callers. A word of caution: If you have several phones on the same line, or if you have call waiting, your computer/phone connection will be disturbed or broken if someone picks up the phone elsewhere in the house or school or if a notification comes of a call waiting.

Another way to connect a computer to a phone line is with an *acoustic coupler*. Acoustic couplers are less common today than they were a few years ago and are seldom used by schools today. This device acts like a microphone to make a connection with the modem through the handset — either a box into which you put the handset or cups that go over the mouth and earpiece of the handset. The acoustic coupler then attaches to the modem. Acoustic couplers are convenient in places like hotels, where a direct connection may be difficult. On the other hand, an acoustic coupler can be awkward or bulky, may not work with modern phones, and may be subject to background noise interference.


ACOUSTIC COUPLER

Another factor to consider when thinking about phone lines is the speed at which you plan to telecommunicate. Older lines (particularly in rural areas) may only allow you to operate at 300 baud. Newer phone lines, particularly those using fiber optics, allow increasingly higher speeds. If you try to communicate at too high a speed, you will get extraneous characters — called *garbage* — in your communications. It is best to check the capabilities of your phone lines before purchasing a modem.

## Software

Once you have your telecommunications hardware in place, you need to make a decision about which software you will use. There is a wide variety of software available for computer communication. These packages may be referred to as terminal emulators, communications software, or simply modem software. Some packages are machine-specific (available for only one brand of computer) while others come in versions for different machines. There are bare bones packages with minimal capabilities and extremely complex packages with many sophisticated features. Some packages are freeware or shareware, meaning that they are available for little or no cost; others cost hundreds of dollars. The kind of software you

need depends on what you are going to do. You may want to start with a simple package, then move up to a more complex one when you are more sure of your needs. A word of caution: Software with few features is sometimes quite difficult to use. It may be better to buy a more sophisticated, user-friendly program, and learn to use its capabilities piece by piece as you are able. Shop for computer communications software as carefully as you would for any other major piece of software or hardware.

Earlier you saw that you do not need to have the same kind of hardware as the computer on the other end of the communications link (called the *host* computer). Similarly, you do not need to have the same software as the host. In fact, if you use a bulletin board or information service it is unlikely that you could use the same kind of software. You only need to be concerned that your software has the features you need and that it runs on your brand of computer and with your brand of modem.

There are minimum capabilities that any communications software must have. Without them, a program cannot communicate with the outside world.

*Establishing a Protocol*

A *protocol* describes how the data is to be sent from your telecommunications system to the host computer. In order to establish a protocol, you must be able to set a series of *parameters* that provide direction for your software and hardware. The terms associated with communication parameters are usually quite technical-sounding. Common terms include parity, duplex, XON-XOFF, etc. (These terms are defined in the glossary of this book.) However, you don't need to understand these terms in order to set up your protocol. Furthermore, different communications software groups these parameters differently. You may need to examine the manual carefully for your particular package.

Because setting parameters can be a bit overwhelming the first time, it is helpful to have someone knowledgeable about such matters assist you when you get started. However, there are a number of common protocols that are worth trying if you don't know the parameters needed by your host computer. The baud rate is determined by your hardware and software, but you may want to begin with 300 baud. Next, set your system for full duplex. If nothing appears as you type, switch to half duplex. Now try no parity, 8 data bits and 1 stop bit. If that doesn't work, try even parity and 7 data bits. If these suggestions don't work, check any literature you have about the service to which you are trying to connect. If that doesn't work, you can always call them!

A protocol is usually established the first time you connect to a new telecommunications source. After the first connection with each remote source, you usually do not need to think about protocols again because most software allows you to save the protocols in a file. Keep in mind that you will likely need a new protocol for each telecommunications service that you use or individual with whom you communicate. For example, if you are communicating directly with another person's computer over phone lines, you need to have a protocol that matches theirs. If you are communicating with a bulletin board or information utility, you may need other protocols that match what those services expect.

*Making a Connection*

In addition to having the ability to establish protocols, communications software needs to be able to connect you to the host computer. If you manually dial the number of a host computer, you will hear a noise called a *carrier tone*. This tone is used to tell your computer system that it can connect to your source. Your system must have the ability to recognize this carrier signal, to establish what is called a *handshake*.

Today, most software allows you to tell the program to dial the appropriate number, but there are instances where you might have to dial the number

yourself and then tell the program to connect with the carrier signal. This is most likely to be the case if you are using an acoustic coupler.

*Sending and Receiving Information*

Finally, your software must have the ability to receive information from and send information to the host computer. After you establish a connection, information begins to appear on the screen. This information is being sent by the host computer. You can respond by typing on your computer keyboard. Whatever you type is then sent to the host computer. Communication goes back and forth between your computer and the host computer.

If you are using a bulletin board or an information service, your communications with the host system will begin with a question asking you to identify yourself. If you connect with a bulletin board you will probably have a *password* that allows you to gain access. This number tells the system that you are a legal user; you should **not** give it to other people. If you subscribe to an information service, you will have both an *ID number* and a password. Your ID number is a public number that serves as your address. It is the number you give to people so that they know how to reach you using telecommunications. Your password, on the other hand, should be known **only** to you; it is your private key to the system.

*Host Software*

When you connect to another computer system, there is always a communication program at work on the host computer. (Recall that the host computer is the computer with which you are connecting.) This program is often referred to as the *host software*. Like your communication program, the host software can be quite simple or very complex.

If you are connecting with a bulletin board, you may be communicating with another microcomputer running host software called *bulletin board software*. This software makes a connection with your computer system and allows you to use the bulletin board. You call the host computer, give your password and browse through the bulletin board using commands that are made available by the bulletin board software.

If you are using an information service, you are most likely connecting with a very large computer system running very complex host software. Frequently, information service software has a wide variety of capabilities that allow you to access the different features of the service. You can send and receive mail, check news or stock reports, search databases, visit an on-line conference, or order from a catalog. Information service software also keeps track of the time you spend on line and bills your account accordingly.

*Recording or Printing a Session*

When you are interacting with a bulletin board service or an information service, you often want to save the information you find. This can be done by sending it to a printer or saving it to disk while you are on line. Some communications software allows you to do both. If you print while you are on line, you have a printed copy of everything you did when you are finished. If you save your session to disk, you can review it later using the communications or your word processing software. You can then edit your session, and keep only the sections of importance for later printing or use.

*Text Editors*

Some communications software packages include a *text editor*. A text editor is usually a low level word processing program. You can use the text editor to compose messages you want to send, or to edit or review a session that has been saved on disk. Text editors are not a substitute for word processing software, but they can be convenient because they are a part of the communications software. You don't have to load another program to work with text.

It is not uncommon for host software, particularly those with electronic mail capabilities, to have a

text editor as well. Such text editors allow you to edit messages that you compose on line. A word of caution: If you are using an expensive service, it is best to compose your messages off line and send them when you connect with the host system rather than work on line where you are paying for every second of time.

*Sending and Receiving Files*

One of the advantages of using telecommunications is the ability to send and receive large amounts of information quickly. For example, you could exchange a worksheet that you were developing with a colleague across the country. Your colleague could edit it or provide commentary and send it back to you almost immediately. You do not need to wait for letters to cross the country. This ability to send and receive files is part of most communications software.

In general, you create your file of information off line. Once you are satisfied with it, you start your telecommunications software and send your completed file to the host computer. This process is called *uploading*. Getting a file from the host computer is called *downloading*. When you upload a file, your communications software retrieves it from your disk and sends it to the host computer. When you download a file, the software saves it on your disk for later use. Files made up of text can be uploaded and downloaded more quickly than you can read them, saving on-line time.

There are two categories of files that you are likely to need to send and receive: *ASCII* (pronounced AZ-key) and *binary*. In general, working with *ASCII files* — also called text files — is much simpler than working with the binary ones. The American Standard Code for Information Interchange (ASCII) is used by almost all personal computers. Each time you press a key on your keyboard, it is converted into a number that is used by your computer to represent that character (e.g., the ASCII value of the letter A is 65, and B is 66, and so forth.) Since this code is standard, it is easy to exchange information among different brands of computers, modems, and different kinds of software.

However, you cannot as easily send pictures, layouts, or special text formats such as bold, italic, or underlined in a text file. To do this, you must send a *binary file*. In general, you will need to specify the format in which you are sending the file. The most common way to upload and download binary files is by using the XMODEM protocol. You will tell your software and the host software to use this format just before you begin a file transfer. Like setting parameters, this can be confusing to a beginner, so you may want to find someone with experience to help you the first time. While sending binary files enables the transmission of graphics, it is not the same as faxing a document. When you send a binary file, you are sending encoded characters and graphics that the receiver can manipulate. When you fax a document, you are sending a picture of that document that can only be printed at the other end.

*Writing Macros*

When you use telecommunications on a regular basis, you will find that you often repeat the same steps each time you make a connection. This can become tedious and time consuming. Many communications software programs provide you with the capability of having your system automatically do routine steps.

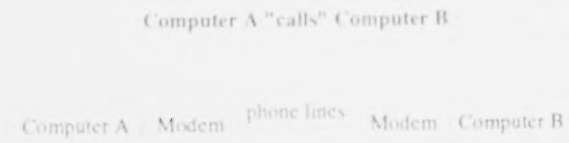
One way to accomplish this is through a *macro*. A macro is like a tape recording of the steps you would follow at your keyboard, except that the computer does all of the steps for you. A macro can simply tell the software to dial a service and provide your ID and password, or it can be quite complex: logging on to the host system, getting your mail, checking bulletin boards, saving the session, and finally logging off. Macros are a great way to make a telecommunications system easier to use. Unfortunately, such capabilities tend to only be available with the more sophisticated communications programs.

## Machine to Machine Connections

Sometimes you want to communicate directly from one computer to another. For example, you may want to upload data from a laptop computer to your larger computer system. Or, perhaps you want to transfer files between two brands of computers. Or, you might want to call another person's computer directly to transfer a file.

### *Using Telephone Lines*

Transferring files from one computer to another using a phone line is not at all difficult. First, you must be sure that the protocols are the same for both computer systems. Once that is established, you need to direct one computer to "call" the other. You then arrange a time to transfer files with the person on the other end of the connection. Next, you dial (or have your software dial) the phone number used by the other modem. In the meantime, the person on the other end of the connection arranges for his or her software to receive a call.




Once a connection is made, you should be able to type messages to each other directly. To send a file, you have your system upload and the person on the other end tells his software to download. The files will then be transferred directly from the disk drive in your system to the disk drive on the other system.

Transferring files in ASCII format from one kind of computer to another is quite simple since most word processing software allows you to save text as ASCII files. When loaded into another word processing program on a different machine, these files are quite easy to edit.

If you are transferring binary files containing complex formatting or graphics, it is easiest if both the sending and the receiving computers are the same. If you are sending binary files to a different brand of computer, the transfer can be difficult unless you are using software specifically designed to accomplish this task. Increasingly, word processing programs that are used on a variety of popular machines are providing the capability of transferring complete files that include formatting from one brand of computer to another.

It is not always necessary to have people involved in the transfer of files from one computer system to another. Some communications software can be set up to automatically make phone calls (autodial) and/or receive phone calls (auto answer). Thus, it is possible that the two computers could communicate without any human intervention once the protocols have been established.

### *Cable to Cable*

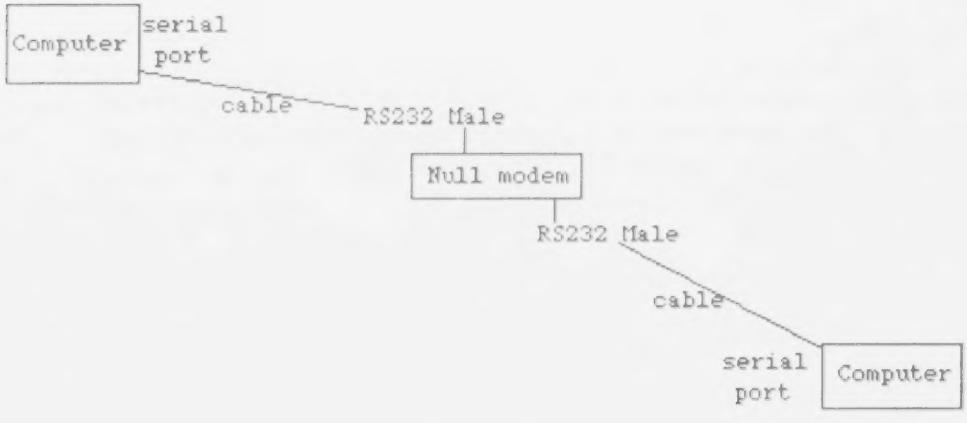
It is not uncommon to need to transfer information directly from one brand of computer to another. Perhaps you have data on an IBM that you would like to modify with your Apple. Or, maybe you have a Tandy portable computer and you want to edit and print your work using a Macintosh. Such transfers are quite easy to make once you have the correct cable configuration. You don't need a modem at all.

First, you must have a cable that goes out of the modem or serial port of each of your computers. You must then connect these two cables using what is called a *null modem*. Perhaps the easiest way to accomplish this task is to have a cable from each serial port that ends in an RS232 male end.

Then, you attach a female to female null modem to each cable. This gives you a cable that runs directly from one modem or serial port to another.

A null modem is not really a modem at all. It simply reverses a couple of "pins" in the cable so that information is sent and received as if there were a modem present.

Finally, you use your communications software to make the communications connection. You set one system to upload a file and the other to download. If all of your connections are made correctly, you will see the information from one computer appearing on the screen of the other.




Cable-to-Cable Transfer Using a Null Modem

# Lesson Plans Using Telecommunications in the Classroom

This section includes teacher-developed plans for grades 6-12 that represent the best entries received in the 1988 Computer Learning Month®/ICCE Telecommunications Lesson Plan Contest. This section is dedicated to all those who sent in their creative ideas for teaching students with telecommunications.

Selecting and editing the lesson plans was a difficult, but rewarding, task--difficult because there were so many excellent ideas in the entries relative to the space available for publishing them--rewarding because the lesson plans demonstrated the exciting things going on in today's classrooms as a result of technology and caring teachers.

As you read through these lesson plans, you will find them categorized as introductory lessons, lessons for use in different subject areas, or on-line research lessons. The last section of the lesson plans includes "Student Dream Projects" which were developed by students, rather than teachers, but offer some creative ideas for classroom activities.

In these lesson plans, you will note that a variety of types of hardware and software products and strategies are used. Whether you have one computer or a number of systems, you will find ideas which you can adapt and use. In many cases, the lesson is truly appropriate for a number of different subjects areas. To make it easy for you to find these plans, a special chart, "A Guide to the Lesson Plans," is included at the end of the lesson plan section. This chart shows lesson plans according to different subject areas, different categories of software and different grade levels and includes the name of the lesson plan, its author and page number.

To ensure the lesson plans are useful to the greatest number of teachers, all lesson plans included are generic in terms of the computers and software required. Entries were edited into a one page format from the original lesson plan entry received in the contest to enable us to include as many ideas as possible in each lesson plan and to include more lesson plans in this book.

As you read through the lesson plans on the following pages, consider them as representative of the best uses of telecommunications in the schools today, given the often experienced limitations on teachers' time to plan, experiment, and learn and on funds for acquiring desired products and resources. We hope these teachers' ideas will inspire you to seek new ways to integrate telecommunications into your classroom to teach your students.

# Introductory Lessons

**TITLE:** Getting Started with Telecommunications

**AUTHOR:** James Backus
Shelter Rock School
Danbury, Connecticut

**MAJOR OBJECTIVES:**

- To communicate with others using a modem and communications software

**GRADE LEVEL:** 6

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line (at each site)
- Software: communications, mystery/detective game

**TIME REQUIRED:** One 50-minute period for contest; one 20-minute period for contest; one 20-minute period for lesson on telecommunications

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Contact a teacher in another school to arrange for a telecommunications exchange.
- Divide the class into two groups. Have each group work to solve a mystery/detective software game. Start students at the same time with the same program. The first group that solves the mystery wins the contest.
- Have the winning group go to the computer and use communications software and the modem to call the "detective" at another school in the school system.
- Arrange with the teacher at the second school for a group at this school to have the same type of contest at the same time. Set up the match so that their winning team will play the part of the detective on their end.
- Have both groups exchange questions and answers over the modem concerning the game. For example, they may ask such questions of the detective as "When did you first suspect...?"

**TITLE:** Using the Computer for Telecommunications

**AUTHOR:** Steve Cook
Muscatel Junior High School
Rosemead, California

**MAJOR OBJECTIVES:**

- To send a letter using telecommunications
- To print a letter, address an envelope correctly, and complete a worksheet on computer telecommunications

**GRADE LEVEL:** 7

**MATERIALS CHECKLIST:**

- One computer; printer; modem; telephone line; on-line service (optional)
- Software: communications, word processing

**TIME REQUIRED:** 2-3 class periods

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software

**ACTIVITIES AND PROCEDURES:**

- Introduce students to telecommunications. Discuss: *Did you know that computers can talk to each other on the telephone? What types of computer components are needed for telecomunications? What type of language do computers use to talk to each other over the telephone? How fast can computers talk to each other?*
- Present the computer, software, and modem. Demonstrate how the components work.
- Hand out an activity sheet with an assignment to type and transmit a letter. Also provide students with directions and a sample letter.
- Demonstrate the procedure for using the printer.
- Discuss the concepts of electronic bulletin boards, baud rates, electronic mail, computers of the future, how doctors and hospitals could use telecommunications, etc.
- Show examples of completed assignments.
- Have students complete their assignment of typing and transmitting a letter and turn in their activity sheet and a copy of their letter.

**FOLLOW-UP/EXTENSION:**

Many offices and companies communicate with computers using telecommunications. People who are able to communicate effectively using a variety of methods usually obtain better jobs and higher pay. Ask students to research what types of jobs in the future will need to use telecommunications.

**TITLE:** Gaining Skills in Telecommunications

**AUTHOR:** Cheryl D. Nefflen
Randolph County Vocational Technical Center
Elkins, West Virginia

**MAJOR OBJECTIVES:**

- To gain experience and increase skills in telecommunications
- To reinforce previously taught skills in using telecommunications applications
- To increase confidence in the use of telecommunications

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; access to an electonic bulletin board (BBS)
- Software: communications

**TIME REQUIRED:** One-hour time block for each activity

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**

- Hide messages for students on an electronic bulletin board to create an on-line "scavenger hunt."
- Have students sign on a network and access their personal mail to find a message directing them to the next location on the BBS, to find a second "hidden" message. Use this technique to get students to explore various sub-boards.
- Include special assignments within messages. For example, use a message to direct the student to sign off the network, go to the library, browse through some magazines pertaining to computers, write a report, bring it back to class, type it on the word processor, and, perhaps, present it to the rest of the class.
- Or, have the student access the announcements or bulletins listed on the board and print copies of them to turn in.
- Or, instruct the student to enter a message for another student, take a break to get a drink of water, etc.
- Evaluate students' completed assignment(s) such as printed copies of the bulletins, printed reports of magazine articles, messages left to another students, etc.

**FOLLOW-UP/EXTENSION:**

Have students use the bulletin board to access a message which contains their grade on the assignment and print a copy of it. Tell students to delete the message and leave a reply for their instructor acknowledging that they received the message.

**ADDITIONAL NOTES:**

Use this assignment(s) to test student recall and retention of earlier lessons about telecommunications. In addition, the assignment tests if students can make a transfer of knowledge based on prior instruction to a new application.

TITLE: Modem Pen Pals

AUTHOR: Carla D. Schutte
Drew Model School
Arlington, Virginia

MAJOR OBJECTIVES:

- To use terminology related to the use of the modem and communication software
- To transmit and receive information using the modem
- To demonstrate the ability to work cooperatively on a group project
- To learn uses of telecommunications
- To develop skills in using word processing software for written work
- To develop skills in using database software

GRADE LEVELS: 4 and 6

MATERIALS CHECKLIST:

- One or multiple computers; modem; printer; telephone line
- Software: on-line simulation package, word processing, communications, database

TIME REQUIRED: 5+ class periods

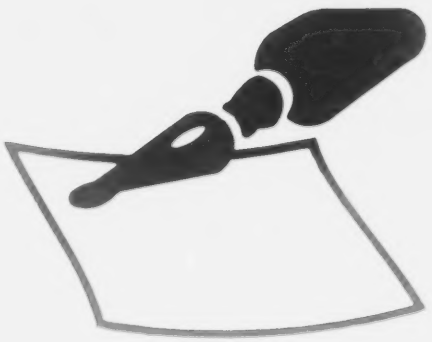
PREREQUISITE STUDENT SKILLS:

- Basic familiarity with the computer and software
- Introduction to telecommunications

ACTIVITIES AND PROCEDURES:

- Demonstrate how to use a modem to groups of students in two different schools. Then provide students with an opportunity to practice using the on-line simulation software. Discuss terminology, procedures, on-line etiquette, and students' responsibilities as users.
- Have each group of students plan questions to ask their partner group in the other school.
- In the first actual on-line session, have the two groups use the modems and a telephone line to exchange questions; afterwards, break the classes into groups to answer the questions they have received.
- During a second on-line session, have the groups exchange answers to the questions.
- Assign one student group the task of planning a questionnaire (to be used with database software off line) to collect information in order to match each student with an "electronic pen pal" in the other class. Transmit the database questionaire and have students in the other class fill in the information requested and send back the completed file.
- Have students enter the information into the database and use the responses to choose pen pals in the other class. Have students write to their new pen pals, requesting them to send back stories or poems they have written.
- Introduce students to local bulletin boards and on-line sources of information which they can use to find information for themselves and for their electronic pen pals.

# Language Arts



TITLE: Mystery Writers Program

AUTHOR: Michael J. Blyth
Concord High School
Staten Island, New York

MAJOR OBJECTIVES:

- To learn how to develop a murder mystery from the beginning, when the body is found, to the end, where the murderer is caught.
- To learn about the "whodunit" as a literary device through careful analysis, reading and writing

GRADE LEVELS: 9-12

MATERIALS CHECKLIST:

- One computer; modem; electronic bulletin board (BBS)
- Learning Link on-line service (Channel 13, WNET--New York, PBS)

TIME REQUIRED: Ongoing

PREREQUISITE STUDENT SKILLS:

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

ACTIVITIES AND PROCEDURES:

- Teach students that the plot in a story is the sequence in which the events of that story are arranged. Point out that if the plot is confusing or not thought out, the reader may get lost and lose interest in the story.
- Have students read writing tips in a student worksheet in the Mystery Writer's Program and then log on to Mystery Writer on Learning Link to check the message center for updates on the mystery in progress. Mystery Writer can provide motivation to encourage students to write.
- Ask students to complete the writing task of identifying the structure and major characters in their story. Provide students with directions to start using word processing software with an activities disk and to work with a file named PLOT.
- Have students complete an organizational chart for their story by answering each question in the disk file using complete sentences, inserting line spaces, saving, and printing their work. Have them answer questions such as: What crime was committed? Who is the victim? Who are the suspects and what are their motives? Who is the detective? Why was he/she chosen for the crime? How does he/she learn about the crime? List three major events in the mystery. How does the detective identify suspects? How does the he/she solve the crime?
- Provide instructions to save and print copies when students finish. Have students review and edit errors in their printed copies before placing them in their binders.

TITLE: Modem Pals Program

AUTHOR: Sally Finley
Hunt Elementary
Margate, Florida

MAJOR OBJECTIVES:

- To interact with other gifted peers in a positive environment
- To use a modem to interact with students from other schools
- To use higher level thinking skills of analysis and evaluation in word and number games played via modem
- To develop creative writing skills using electronic mail on a local bulletin board

GRADE LEVELS: K-5

MATERIALS CHECKLIST:

- One computer; modem; printer; telephone line (at each site)
- Electronic bulletin board service (BBS)
- Software: database, communications, games

TIME REQUIRED: School year

PREREQUISITE STUDENT SKILLS:

- Basic familiarity with the computer and software

ACTIVITIES AND PROCEDURES:

- Send a letter to each participating teacher explaining the Modem Pals Program along with student applications.
- Create a database to store information on all students participating in the Modem Pals Program including their teacher, school, hobbies, age, and gender.
- Match students in the program with peers in other schools according to the information they have provided. Try to match Modem Pals in the same grade and of the same gender.
- Give Modem Pal members a membership card including modem identification number and local bulletin board number.
- Encourage Modem Pals to send electronic mail (using a bulletin board for elementary children,) participate in on-line conversations, play word games, write original word games, exchange baseball cards, and extend invitations for school events.
- Create an adventure story electronic bulletin board. Have one student begin a story and leave off in the middle of a sentence for another student to continue.

FOLLOW-UP/EXTENSION:

Plan a year-end picnic to bring Modem Pals together so that they can meet in person.

**TITLE:** Using Telecommunications to Prepare for a State Writing Test

**AUTHOR:** Brenda Holcomb
Newton Conover Middle School
Newton, North Carolina

**MAJOR OBJECTIVES:**

- To improve point-of-view/persuasive writing skills
- To write papers in preparation for a state writing test
- To develop proficiency in using word processing software and telecommunications

**GRADE LEVELS:** 6-8

**MATERIALS CHECKLIST:**

- Multiple computers; printer; modem; telephone line
- Software: communications

**TIME REQUIRED:** 3-4 weeks

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and word processing software

**ACTIVITIES AND PROCEDURES:**

- Discuss techniques of writing point-of-view/persuasive papers.
- Teach students to follow an outline/model for writing and provide a model to students.
- Assign students a topic. Have them write, edit, and print papers on the topic, using the model.
- Pair each student with a peer from another school in order to exchange papers using the modem and communications software.
- Have students read, edit, and grade (using a score of one to four) the final papers. Provide students with tally sheets with notes to aid in grading such as, "Were clincher sentences used to sum up each paragraph as well as to recapitulate the entire paper?" and "Did students support their statement with reasons which contained details and/or examples?" Have students give higher scores to papers in which students stated their argument in the introductory paragraph and went on to develop a paragraph for each reason given. Be sure students make constructive suggestions for improvement.
- Have students send tally sheet results, scores, and suggestions for improvement back to the papers' authors using the modem and communications software.

**FOLLOW-UP/EXTENSION:**

After the students taken the state writing test, have them compose, type, edit, and print a paper during computer class using the same topic. Or, let the language arts teachers assign and grade a point-of-view/persuasion paper. Then have the students type and print a corrected copy.

**TITLE:** Voices Across the Wires

**AUTHOR:** Kenneth C. Holvig
Clarkstown South High School
West Nyack, New York

**MAJOR OBJECTIVES:**

- To create a national magazine of student writing using telecommunications, peer editing, and desktop publishing

**GRADE LEVELS:** 10-12

**MATERIALS CHECKLIST:**

- One computer; modem; printer; telephone line
- Software: word processing, desktop publishing, communications
- Access to at least one electronic bulletin board (BBS) or commercial on-line service

**TIME REQUIRED:** 10-12 hours, over 25-30 class periods

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and word processing software
- Telecommunications knowledge and capabilities
- Experience in writing essays, short stories, poetry, fantasy, etc.

**ACTIVITIES AND PROCEDURES:**

- Familiarize yourself with the process of logging on, downloading, uploading, saving and converting files.
- Post a letter on the bulletin board of a computer network that states "...we wish to publish a national magazine of student writing. 'Voices Across the Wires' (title of publication) will highlight the works of students around the country whose classrooms are linked via telecommunications. My students will act as editors, selecting up to 5 pieces of the best student writing from your class or school. You will receive the text of the magazine by mail on a disk. If you need fast response regarding questions or problems, please inform me via e-mail..., etc."
- Appoint one student as editor-in-chief and assemble a staff including assistant editor, graphics designer, typists, proofreaders, publicity director, and technical director.
- Have students download manuscripts on a regular basis, print copies, and distribute pieces to be read, evaluated, and edited. Have the staff select the best pieces.
- Assist the staff in laying out, printing, and assembling the final magazine using desktop publishing software.

**FOLLOW-UP/EXTENSION:**

Get some publicity for the project. Contact a local newspaper; they may be very interested in what you are doing.

**ADDITIONAL NOTES:**

By the instantaneous linking of schools and the production of this publication, you show students that their writing matters. This kind of electronic publication shrinks the nation, bringing its very fabric into your classroom where it may be stretched, touched, and tailored to fit.

**TITLE:** The MusicBio

**AUTHOR:** Susan Pellegrini
Ridge High School
Basking Ridge, New Jersey

**MAJOR OBJECTIVES:**

- To develop a working knowledge of telecommunications concepts and practices
- To develop writing, organization, and comprehension skills
- To develop motivation for writing by using positive rewards
- To develop public speaking skills by using the interview process and video critique
- To create a stronger positive self image
- To develop skills in using word processing software and video production

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line
- Video camera; VCR; television monitor(s); video editing machine (optional)
- Software: word processing, communications

**TIME REQUIRED:** 3 weeks

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer, software, and telecommunications

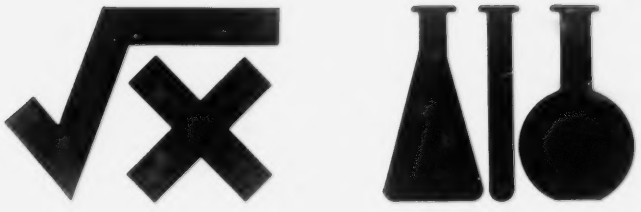
**ACTIVITIES AND PROCEDURES:**

- Have students use "process writing" to construct a personal history using music as a theme, a "MusicBio."
- Have students use brainstorming and peer teaching as part of the process approach.
- To help students get started, give them a RockBio Brainstorm List. This list might include writing prompts such as student's favorite song now and five years ago, songs that make the student feel happy, lonely, sad, etc. Allow students to listen to music on a tape player to recall memories. Encourage students to work with peer partners who can share their memories, and work with them on the editing process.
- Have both peer partners work with the RockBio to create an interview from the information. Assign students to create a five-minute interview, videotaped and edited. Then have partners switch roles. Share the videotaped RockBios in class. Have the class critique the program.
- Send the written biographies to schools participating in a telecommunications exchange and request their students to send biographies in return. Have students crtitique the exchanged RockBios and send a reply to the partner schools. Have the students share their video interviews with the partner schools.

**ADDITIONAL NOTES:**

My students chose Rock music as the most relevant to them; therefore their work was called "RockBios," however, any type of music is applicable. The purpose of using music as an emphasis is that it triggers emotional memories of specific events. Students like the fact that they are part of a network which includes peers from around the world. They feel they are participating in the "future of education."

# Mathematics/Science



**TITLE:** Powered By the Sun (Solar Car Project)

**AUTHOR:** Harvey Champigny
Lowell Public Schools
Lowell, Massachusetts

**MAJOR OBJECTIVES:**

- To introduce students to an alternate energy source and its ecological impact
- To define solar power
- To utilize database research and telecommunications
- To provide practice in writing scientific reports and to learn the importance of disseminating results
- To use a mathematical formula involving voltage

**GRADE LEVELS:** 6-8

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line services
- Optional: radiometer, magnifying glass

**TIME REQUIRED:** One class period for lesson; additional time for project

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Write the term *solar energy* on the board. Demonstrate the energy potential of the sun's rays using a magnifying glass. Demonstrate the radiometer, a simple solar engine, to illustrate the photon energy theory. Discuss.
- Have students view a 20-minute videotape on the M.I.T. solar car project. Following this, lead a discussion on solar car transport systems. Have students sketch a prototypical solar car of the future. (A videotape of solar vehicular transport may be available from your math or science department or library/media center.)
- Have students utilize databases to research and define the vocabulary items included in this lesson.
- Use telecommunications to send a written report on solar energy transportation of the future to another school.
- Have the students use elementary mathematics to calculate the voltage, current, or resistance as presented on a electronics worksheet relating to solar vehicles.

**FOLLOW-UP/EXTENSION:**

Invite a consultant on solar technology (from a local university or utility, for example,) to speak to your students.

**TITLE:** Studying Migrations via Telecommunications

**AUTHOR:** Jim Douglas
Independent School District #656
Faribault, Minnesota

**MAJOR OBJECTIVES:**

- To become active participants in research and learning
- To cooperate with other students in Canada and Mexico in a scientific study
- To learn the principles and procedures of scientific research
- To make a genuine contribution to the body of scientific knowledge

**GRADE LEVEL:** 5

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line service
- Atlas
- Software: communications

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer, modem, and software
- Introduction to telecommunications
- Experience catching and banding butterflies

**ACTIVITIES AND PROCEDURES:**

- Contact schools, universities, nature study centers, and other organizations to find a research collaborative studying the migration of a species. Establish a link to the network's computer. (If a common computer network for communication doesn't already exist among these groups, start doing research anyhow, using the mail to communicate, until you are able to establish a computer link.)
- Have students band Monarch butterflies and/or count flocks of geese and post their observations on a telecommunications network (or in a local database). Collect and mark on a map migration reports posted on the network or sent to you by other schools. Schools in other countries report their results on computer networks too; have students use an atlas to locate where these reports originate.
- Try to arrange for a knowledgeable moderator to pose and answer students' questions on an electronic bulletin board on the research collaborative's computer network.
- Teach students about estimating, observation, and reporting. Have students analyze the data they collect and draw conclusions about patterns that appears on their map.

**FOLLOW-UP/EXTENSION:**

In this project, students still do not find the involvement and excitement that comes from true collaboration with others. In a more extensive project, have students catch, band, and release Monarch butterflies and post the band numbers of butterflies on the network so that any banded butterflies caught by other students will lead to a contact. Little data actually exists as to the patterns, times, and habits of migrating Monarchs so there is a great window for theorizing and discussion between students.

## Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom: MATHEMATICS/SCIENCE

**TITLE:** Earth Link

**AUTHOR:** Rita Henry
Glen Ridge High School
Glen Ridge, New Jersey

**MAJOR OBJECTIVES:**

- To isolate and define local environmental events linked to regional, national, and international environmental trends
- To link these local environmental events such as drought, flooding, and pollution to their consequential impact on human and environmental problems such as health hazards, economic destruction, and the greenhouse effect
- To engage science classes in the creative process that guides the successful communication of scientific knowledge, along with its attendant social responsibility
- To link students in science classes around the world via telecommunications and satellite to share research and create a dialogue

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line
- Software: communications, word processing, spreadsheet, database
- Subscription to on-line services and data networks

**TIME REQUIRED:** 2-3 weeks for initial research; ongoing work through school year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer, telecommunications, and word processing, database, and spreadsheet software
- Library and database research skills; ability to work in groups

**ACTIVITIES AND PROCEDURES:**

- Divide students into small groups to select and conduct research on an environmental issue. Have students gather information from both print media and on-line sources such as AP and UPI stories, NOAA Weather Wire weather warnings, message threads from on-line scientific conferences, and electronic mail. Also, let them download Weather Service weather maps as graphics files for comparative study. Have students search on-line databases for information.
- Have each group download information from on-line sources and key additional information into word processing, spreadsheet, and database software to create a report with statistics illustrating the links between local/regional events and national/global events and predicting trends. Ask students to analyze the source and scope of problems and to report and/or suggest local, regional, and global solutions.
- Have students share their reports with the class and post them on an electronic bulletin board.
- Have students write a comparative study (of their report and the reports of others in the class) as an addendum to their own report.

**FOLLOW-UP/EXTENSION:**

Encourage students to find and pursue cooperative action with the students they have contacted on line. Also, have students exchange cultural and geographic data on line.

**TITLE:** Pascal Via Telecommunications
(Course teaching Pascal to students in 8 schools around the world)

**AUTHOR:** William R. Morgan
Kubasaki American High School
(Department of Defense Dependent School)
Okinawa, Japan

**MAJOR OBJECTIVES:**

- To become familiar with the uses of a telecommunications network
- To learn the "how" of Pascal programming
- To learn methods for problem solving
- To learn the importance of structured, well thought-out programming
- To recognize the need for "readable" programming code
- To unite students in several schools into a single "electronic classroom"

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; printer (at each site)
- Software: communications, word processing
- Telecommunications network, electronic bulletin board (BBS)
- Tutorial materials on videotape and disk

**TIME REQUIRED:** One school year

**PREREQUISITE STUDENT SKILLS:**

- Computer, software, and telecommunications skills

**ACTIVITIES AND PROCEDURES:**

- Establish a telecommunications network as a "backbone" to link participating schools into an "electonic classroom." Direct the course on the network by posting "items" on an electronic bulletin board such as the week's assignment, thought provoking questions, or students' questions.
- Develop and provide materials to all students including disk tutorials and videotapes.
- Have students practice logging on by using a tutorial disk and watching a videotape of an actual on-line session. Students may log on via a commercial network.
- Teach students how to upload and download data in a timely manner. As the cost of telecommunication can be expensive, stress good habits throughout the course. Limit students to three lines of type for any response on line; otherwise, have them type their response off line using word processing software and upload it to the network.
- Show students how to communicate on line with each other as well as with their teacher. Encourage both "public" and "private" conversations on line.
- Post "items" on line at the start of each week including due dates for all assignments.
- Test students on line as well. Create a collaborative test as a final exam, with students in every location participating in a single programming project.

**ADDITIONAL NOTES:**

The teachers who planned this course are currently developing a year-long course in Pascal programming to prepare students for the Advanced Placement exam in computer science. Telecommunications has proven to be ideal for this world-wide school district.

**TITLE:** Telecommunications in Science

**AUTHOR:** Don Petersen
Cutler Ridge Middle School
Miami, Florida

**MAJOR OBJECTIVES:**

- To investigate the acid/base content of common household products
- To read pH measurements using wide range pH paper
- To record data on a chart
- To post a message on a local electronic bulletin board (BBS) indicating the results of tests on 5 household products
- To monitor the BBS and respond to questions

**GRADE LEVELS:** 6-8

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line service
- Access to a local electronic bulletin board (BBS)
- Software: communications, graphics, word processing
- Litmus indicator paper, wide range pH paper, various household products

**TIME REQUIRED:** 2-3 class periods

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Demonstrate the color change of wide range pH paper when immersed in various liquids. On the blackboard, record each tested item to create a chart of findings.
- Ask students to read the relevant section of their science text for background.
- Have students conduct tests to determine the acid/base content of household products.
- Assign students to work with their team to create a colored pH scale using color graphics software.
- Have students use a computer and modem to access a local electronic bulletin board and post the results of the tests on each of the items.
- Request that replies to the messages be sent as public messages for all to see.
- Have students read through the BBS messages as a team, and, where possible, investigate and answer other students' questions.
- Remind students to check with their teacher before answering any BBS messages.

**FOLLOW-UP/EXTENSION:**

Have students use word processing software to write an essay about acids around us.

**ADDITIONAL NOTES:**

Students often ask questions of others on the BBS, for example, "How did you get a pH level of 4.5 in your water, when we measured a pH level of 6.0?" Use this opportunity to lead into a description of "how" the measurements were taken. Try to foster inquiry and problem-analysis.

**TITLE:** Physical and Chemical Weathering

**AUTHOR:** Cheryl Taylor
Badillo School
Covina, California

**MAJOR OBJECTIVES:**
- To learn about the causes of physical and chemical weathering
- To learn how acid rainfall is one factor contributing to this phenomenon

**GRADE LEVEL:** 5

**MATERIALS CHECKLIST:**
- One computer; RGB monitor; printer; modem; telephone line
- On-line service with science activities
- Software: communications

**TIME REQUIRED:** Three months of science time, plus some math time to interpret graphs and charts

**PREREQUISITE STUDENT SKILLS:**
- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**
- Familiarize yourself with on-line science activities designed to teach students about the natural phenomena that promote physical and chemical weathering in our country.
- Teach an introductory unit on current environmental issues in the U.S.
- Have students measure the acidity of local rainwater.
- Use the on-line service to have students discover patterns of acidity in rainwater across the continent. Have students post their data on rain acidity on line for students in other schools to use. Download the data on acid rain posted by other schools and use it to create maps and charts.
- Use telecommunications in this way to share the information with students doing the same kind of study in different areas of the country.
- Teach students how to apply the scientific processes of comparison, observation, and inference throughout the entire investigation.

# Social Studies

## Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom: SOCIAL STUDIES

**TITLE:** Let the Games Begin!

**AUTHOR:** Yvonne Andres-Syer
Jefferson Junior High School
Oceanside, California

**MAJOR OBJECTIVES:**

- To develop descriptive writing skills
- To broaden cultural experiences
- To become aware of the similarities and differences among children all over the world
- To create a database of noncommercial games and their rules
- To learn how to collect, organize, store, and retrieve data using telecommunications

**GRADE LEVELS:** 7-8

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line services
- Software: database, communications

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Write a "Call for Collaboration" requesting information. For example, to find data about games, write a request to other teachers to have their students brainstorm to develop a list of noncommercial games they have played.
- Send this request to potential collaborators via all the educational electronic bulletin boards accessible. Also request that schools that have connections on other educational networks and are willing to serve as relays post your message and forward all replies to you.
- Have students collect the names and rules of the games and enter them into a database. If there is a game (or other information) that your students have not heard of, have them send the collaborating students a message, requesting a description of how the game is played and what the rules are.
- Assemble an international database of games and their rules as a final product. Have students send this database to all contributors.

**ADDITIONAL NOTES:**

If unlimited access to funds are available, arrange to have a live interactive video conference set up between the participating schools so that students, parents, and educators could observe as the children met via video for the first time. Or, have a real summit, where one student and one educator from each participating state or country would fly to a central location to meet and actually play some of the games collected in our database. Ideally, a free multi-user educational bulletin board system would be established, so that students could continue to learn from one another and collaborate on future projects. Electronic World Games could become an annual event as a step towards global understanding.

TITLE: Accessing Newspapers Across the Country

AUTHOR: Greg Dunnington
Mayport Junior High School
Atlantic Beach, Florida

MAJOR OBJECTIVES:

- To interpret the cultural components, natural resources, agricultural problems, interdependence, and impact of foreign competition in various regions of the U.S.
- To learn modem use, database access, and retrieval of information from a database
- To evaluate information critically and apply research appropriately
- To synthesize information for an oral presentation to classmates
- To participate in cooperative planning within a group

GRADE LEVEL: 7

MATERIALS CHECKLIST:

- One computer; modem; telephone line; on-line service; electronic bulletin board (BBS)

TIME REQUIRED: 6 weeks

PREREQUISITE STUDENT SKILLS:

- Basic familiarity with the computer and software
- Introduction to telecommunications

ACTIVITIES AND PROCEDURES:

- Divide the class into groups of four or five students. Assign each group a topic to study to interpret the issues affecting various regions of the U.S. Include as topics: the impact of foreign competition on the region; agricultural problems affecting the people of the area; problems related to natural resources or the environment; and effects on the culture when the physical environment is altered.
- Have each group research their assigned topic with traditional reference materials and provide time for groups to work on line with the database.
- Have the students in each group develop an outline of specific topics and questions to research on line. Have students examine newspapers published in at least four areas of the United States.
- Following the information retrieval, show students how to use criteria to assess reporting bias.
- Assign students to develop an oral presentation to share information with the class.

ADDITIONAL NOTES:

Students show enthusiasm for using new technology to gain information and are surprised that information in newspapers across the country has different emphases. The stimulus of electronic research combined with group competitiveness spurs students so that the final group presentations can be quite good.

**TITLE:** Peace Across the Pacific: An Ongoing Telecommunications Project

**AUTHOR:** Linda A. Ferullo
School of the Future, Tobin School
Cambridge, Massachusetts

**MAJOR OBJECTIVES:**

- To use a word processor to create stories and letters
- To send work to students in another country via telecommunications
- To study a broad spectrum of various cultures
- To study specific information about a designated country
- To develop interview techniques using the computer
- To write news articles to share via telecommunications
- To learn the ethics and operations of telecommunicating between countries

**GRADE LEVEL:** 7

**MATERIALS CHECKLIST:**

- Single or multiple computers; modem; telephone line; printer
- Software: word processing, communications

**TIME REQUIRED:** 13 class periods in first unit

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software.

**ACTIVITIES AND PROCEDURES:**

- Work with local and international contacts to find a "sister school" in another country with a teacher willing to participate in a telecommunications exchange.
- Teach students about the computer system, word processing, saving information, and printing it.
- Have students write and edit stories to be sent to students in a sister school.
- Demonstrate the steps to dial, log on, enter name and password, read messages, and send them, using a telecommunications network.
- Teach about the ethics of telecommunications including pirate boards, destruction boards, "crime-ware", on-line racists, and electronic espionage.
- Arrange a situation with a local school for practice in reading and sending messages.
- Teach students generalities and specifics about the country and culture of your sister school using print materials and computer software.
- Have students send a message to their sister school overseas after mastery of this exercise with a local school.

**FOLLOW-UP/EXTENSION:**

Invite guest speakers familiar with the country where the sister school is located to visit the class. Assign oral and written reports. Have students write a report on a specific topic with information they have learned from interviews of students in their sister school. Have students write about why the computer should not be used in a negative way.

**TITLE:** Telecommunicating with a School in Another Country

**AUTHOR:** David Hamilton
Sentinel High School
Missoula, Montana

**MAJOR OBJECTIVES:**

- To send a response via modem to students at an overseas high school in reply to a message from them
- To formulate impressions of the students at that school through the exchange of a series of reciprocal messages
- To express views and opinions of personal, local, national, and international issues with students of another culture
- To encourage students to reevaluate their own views in light of the responses received

**GRADE LEVELS:** 10-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line service
- Software: communications, word processing (integrated with communications)

**TIME REQUIRED:** One class period; periods of 5-15 minutes for message exchanges

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**

- Establish contact with a school overseas for a telecommunications exchange if none.
- Review any previous communications between schools (optional).
- Hand out copies of the most recently received message from overseas school.
- Have students read the message, jotting notes about items of interest, questions to answer, questions raised, and clarifications necessary in the class' own response.
- Discuss the contents of the message in light of notes taken.
- Discuss answers to the other school's questions about your students (optional).
- Brainstorm for new questions to ask the partner school (optional).
- Have students gather in groups to write messages to send back to the other school.

**FOLLOW-UP/EXTENSION:**

Try everything from individual efforts to class consensus to compose messages to send. Generally groups of two, three, or four students work best. New groups of students need more time and structure to generate and respond to messages. Post all messages on a bulletin board, with maps, pictures and other information about the other school.

**ADDITIONAL NOTES:**

The short turn-around time in receiving messages on-line compared with regular mail fascinates students and enables a significant return in a relatively short time. Telecommunications gives a newness, quickness, and ease to sending messsages that cuts through many barriers of written communication. Students view their international peers with less of a stereotype. They also see themselves differently in comparison to students in another country.

**TITLE:** Sixth Grade Girls in Distress

**AUTHOR:** Merle Marsh
Worchester Country School
Berlin, Maryland

**MAJOR OBJECTIVES:**

- To work together as a team to find information about women who have been successful in the fields of mathematics, science, business, and computer technology
- To use telecommunications to obtain this information
- To motivate girls to use computers
- To start an exploration of career opportunities

**GRADE LEVEL:** 6

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line service(s)
- Overhead projector and projection panel (optional)

**TIME REQUIRED:** Lesson--one day; activity--school year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Ask girls to name famous people in the fields of science, computers, mathematics, and business; particularly encourage them to name woman.
- Divide the girls into groups of four. Give each group five minutes to come up with a plan to find out about women today who are successful in business and government.
- Suggest that the students use telecommunications as a resource. (Our students chose to write a letter and send it by modem to ask user groups for information. Drawing on their own experience with on-line services, the students sent a concise, group letter with the attention-getting headline *"SIXTH GRADE GIRLS IN DISTRESS."*)
- Show how to use on-line reference sources as another potential source of information.

**FOLLOW-UP/EXTENSION:**

Have students set up committees to continue the project on a long-term basis, i.e., to check for incoming electronic mail each morning, collect and sort data. Ask the committees to print out information which seems pertinent, respond to some information sources, and create and maintain a database of the information collected. Find parents or others to volunteer to help students continue their project during the year.

**TITLE:** A Window on the World

**AUTHOR:** Peni Martel
Cariboo Hill Secondary School
Burnaby, British Columbia, Canada

**MAJOR OBJECTIVES:**

- To develop awareness of the role of telecommunications and uses of various telecommunications technologies
- To foster an understanding of the use of computers and software in the telecommunications process, e.g., word processing, database, and modems
- To increase awareness of the world as a community through participation in a world-wide event, i.e., viewing the Olympics and sending Olympicgrams
- To create a personal Olympic experience for each student
- To encourage students to become involved with their national team

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One or multiple computers; modem(s); telephone line; printer
- Other telecommunications resources (optional)
- Software: communications, graphics, word processing
- VCR and television monitor(s)

**TIME REQUIRED:** Three weeks preparation; two weeks to view Olympics; two weeks to complete a project

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**

- Encourage students to send *Olympicgram* messages to athletes of their choice. Transmit messages directly to the Olympic Communications Center where they can be relayed to The Olympic Village. Or, send messages to participants in another international event.
- Have students view the Olympics or other event daily; establish a direct feed from a satellite dish to a *global classroom* of world news sources. Foster an awareness of the importance of telecommunications by viewing both taped and live events. Discuss satellite receivers and earth stations to illustrate the telecommunications resources needed to send messages to the athletes and to view events such as the Olympics.
- Have students read relevant newspapers and magazines, plus database materials.
- Assign students a written report or presentation on a variety of topics relating to the Olympics or another international event such as profiles of present or former Olympians, or reports on highlights or incidents during current or past Olympics, etc.

**FOLLOW-UP/EXTENSION:**

Take students on a field trip to a telecommunications center. (We visited *Teleglobe Canada.*) Or, invite a former Olympic athlete (Joy Fera, a rower in the '76 Olympics, came to our school) to speak at your school on topics such as random drug testing and the meaning of *Olympic Spirit.*

**TITLE:** Monarch Toys

**AUTHOR:** Peter M. Sol
Cariboo Hill Secondary School
Burnaby, British Columbia, Canada

**MAJOR OBJECTIVES:**

- To participate in a business simulation
- To understand the use of a modem
- To organize a simulated business branch office
- To communicate with other countries

**GRADE LEVELS:** 11-12

**MATERIALS CHECKLIST:**

- Multiple computers; modems; telephone line
- Software: communications

**TIME REQUIRED:** One term (13 weeks), part-time

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Basic understanding of business organization and communications

**ACTIVITIES AND PROCEDURES:**

- Develop materials for an in-basket business simulation to occur in classrooms (branch offices) at several locations, all communicating via telecommunications. Write a company manual to distribute to each branch office.
- Send each participating school a problem set each week to which they must reply. Include letters from customers, suppliers, and the Head Office. In addition, pose one or two scenarios for each branch office every week that require the branch to set policies and make group decisions.
- Keep the organization of Monarch Toys simple. Have each participating branch office set up an organizational chart similar to one in the company manual. Let each branch select a Branch Manager, fill other positions, and then send that data to the Head Office. Allow student contacts to conduct all communication between offices.
- Week 1: Introduce the program and set up branch offices.
- Weeks 2-3: Send Problem Sets from Head Office to all branch offices both weeks.
- Week 4: Develop and distribute a special class discussion problem set.
- Week 5: Assign branch office department specialties.
- Weeks 6-8: Send Problem Sets to all branch offices each week.
- Week 9: Hold a branch office conference.
- Week 10: Collect the first three Problem Sets.
- Week 11: Assign department reports and send a sixth and last Problem Set.
- Week 12: Collect the fourth problem set.
- Week 13: Provide for closure, collecting all remaining problems sets and reports.

**FOLLOW-UP/EXTENSION:**

Try assigning students to tasks such as creating TV, radio, newspaper, and billboard ads, writing job descriptions and personnel procedures, making transportation and communication arrangements, and preparing payroll.

**TITLE:** Teenage Needs

**AUTHOR:** Ron Swanberg
GFW High School
Winthrop, Minnesota

**MAJOR OBJECTIVES:**

- To use information in on-line databases to investigate a problem effecting teenagers
- To analyze the information collected from databases by writing a newspaper article

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line service with databases
- Software: communications, word processing

**TIME REQUIRED:** 10 minutes on line to collect information; one class period to analyze information and write an article

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

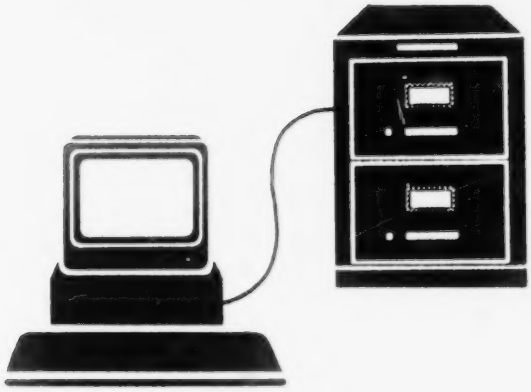
**ACTIVITIES AND PROCEDURES:**

- Show the class how to dial and log on the on-line service. Navigate through the various menus, and show the class examples of the kinds of information available.
- Hand out an activity sheet which offers a hypothetical grant to help teenagers in the local area. Offer students their choice of teenage problems to investigate using on-line databases including chemical dependency, alcohol abuse, teenage pregnancy, eating disorders, and/or crime and delinquency.
- Have students choose a topic and appropriate database(s) to investigate before they log on. Then have students do the on-line research together in groups.
- Have each group write a "grant application" or a newspaper article or editorial examining their chosen problem and explaining why it is necessary for the county to attack that problem.

**FOLLOW-UP/EXTENSION:**

Encourage students to select a variety of problems to investigate. Have groups discuss the information they collect with groups who collect different information. Lead a discussion about the differences between large cities and rural areas.

# On-line Research



**TITLE:** University Communications

**AUTHOR:** Mary Garrett
Shiawassee County ISD
Corunna, Michigan

**MAJOR OBJECTIVES:**

- To learn the steps to access a local university's on-line services
- To list search strategies for using a library catalog database
- To list the attributes of a menu driven database and a key topic database
- To list benefits and potential problems of on-line databases for accessing information

**GRADE LEVEL:** 12

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; overhead projection panel; printer
- Software: communications; access to local university computer network

**TIME REQUIRED:** 4-6 hours

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Some time spent on vocational/higher education planning

**ACTIVITIES AND PROCEDURES:**

- Present the class with an introductory lecture on telecommunications, explaining baud rates, telecommunications etiquette, etc. Explain how to use informational databases as well as specific local databases. Pair students together for a set of research tasks.
- Have students log on to the university network and complete the following activities:
- Find out what financial aid is available from the university.
- Read the vocational news posted between two particular dates.
- Determine what books by a particular author are owned by the university library, which of those books are currently out, and which branches of the library hold the ones that are in.
- Find out if the university's library owns a specific book, if it is checked out, and which branches of the library hold the book.
- Determine what books are available on a specific subject.
- Check what software is available in the main library in a specific subject area. (Show students how download the entire list of software to a disk file and search for the specific subject off line.)
- Make a list of the names and phone numbers of counselors that may be able to provide information about a particular area of study at the university.

**FOLLOW-UP/EXTENSION:**

Discuss students' experiences and findings. Ask students to bring in information to share on other on-line databases (commercial and local BBS's). Have students find out more information about these services. Ask students to bring in articles on databases and "hackers"; discuss computer ethics, privacy, and data security. Discuss the benefits and problems of having large collections of data accessible by telecommunications.

**TITLE:** Computer Processed Research (Contructing a Research Paper)

**AUTHOR:** Barry Jahn
Sprague High School
Salem, Oregon

**MAJOR OBJECTIVES:**

- To use a computer and telecommunications software effectively
- To limit a research topic by using effective and efficient search techniques
- To refine and retrieve information related to a research topic

**GRADE LEVELS:** 9-12

**MATERIALS CHECKLIST:**

- One or multiple computers; modems; printer; telephone line; on-line service(s)
- Software: word processing, communications
- Teacher-developed search strategy worksheet

**TIME REQUIRED:** Two half-periods for introduction; 45 minutes research time for each student pair

**PREREQUISITE STUDENT SKILLS:**

- Some familiarity with the computer

**ACTIVITIES AND PROCEDURES:**

- Introduce students to computers and telecommunications. Discuss the relationship between the computer and modem and the steps students must follow to go on line.
- Distribute a search strategy worksheet that provides students with instructions on how to log onto an on-line service, select a topic, choose an appropriate database(s), and select the key concepts or search words.
- Next, demonstrate the process of using a computer, modem, and communications software to go on line, refine a topic, use appropriate search techniques, and retrieve relevant information.
- Divide the class into small groups to practice the demonstrated skills.
- Have students select research topics. Have some students enage in other (off-line) aspects of constructing a documented research paper while others are on line.

**FOLLOW-UP/EXTENSION:**

Have students select appropriate articles (by title or abstract) and download them onto data disks for immediate word processing. Have students use word processing software to create outlines of their research, rough drafts, and footnotes, as well as their final papers. Encourage the use of this writing technique in several curricular areas.

**TITLE:** Class Link Project

**AUTHOR:** Rita G. Quinn
Cornwall Consolidated School
West Cornwall, Connecticut

**MAJOR OBJECTIVES:**

- To increase the daily interaction of students with other "classmates"
- To link together classes of students in two small schools using telecommunications

**GRADE LEVEL:** 8

**MATERIALS CHECKLIST:**

- One computer; modem; telephone line; on-line services
- Software: communications
- Two teachers willing to develop on-line programs to use together

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Introduction to telecommunications

**ACTIVITIES AND PROCEDURES:**

- Collaborate with a teacher in another location in the U.S. to put together cooperative assignments and activities in various curricular areas. Once contact is established, try to work together on line.
- Language Arts: Together, develop a series of writing assignments. Have students use word processing software to write. Review students' work with the collaborating teacher by sharing the writing files between the two classes. Group students in the two classes together for instruction, with some groups of students taking instruction via modem in one or more content areas.
- Science: Have both classes participate in a science telecommunications project. Share findings with each other as well as with a wider telecommunications network.
- Social Studies: Use the fact that the schools are situated in different parts of the country to explore different issues and perspectives; share these insights during on-line discussions of current events. Learn what makes headline news in both areas of the country.
- Research Skills: Have students sharpen research skills by accessing databases that contain information difficult to find in small communities with limited local resources. Demonstrate to students the educational advantage of access to a larger library.
- Social Interaction: Provide each student with a private mailbox on line for corresponding with other students to increase the social interaction so important for students in a small school.

# Student Dream Projects

# Telecommunications Dream Projects

The Telecommunications Dream Project Contest, a competition for students, proved to be one of the most successful competitions during Computer Learning Month in October, 1988. Students were asked to tell about their "dream project"-- a project they would really like to do with their friends -- using telecommunications. The contest rules required that they include the idea of communication with people in another state or country, involve cooperative efforts among a number of different students, and make use of technology that is available today. Financial considerations, however, could be neglected. The call for entries encouraged students to use their creativity, knowledge of telecommunications, and presentation skills.

The response was remarkable. Telecommunications Dream Projects arrived from all over the nation. The students' work in many cases showed evidence of a surprising understanding of telecommunications technology -- and a refreshing shot of imagination. Many of the projects were quite realistic. In fact, some were surprisingly similar to the telecommunications lesson plans submitted by teachers. Others, while impractical for use in most classrooms today, demonstrated a keen, informed outlook on the future of computer and telecommunications technology. Together, the projects offer a glimpse at the perceptions of today's students on the technology of the present and the future.

The lesson plans that follow are derived from a select group of the Telecommunications Dream Project entries received from students. Use them as lesson plans, as an inspiration for class projects, or simply read them for the fun of it. It was challenge to select the few projects to print here; those chosen were included for their excellence, creativity, and the variety of their themes. While every effort was made to print the projects in their entirety, publication required the elimination of the graphics and some of the text created by students. The lesson plan format was selected as the best way to capture the essence of the students' ideas.

The Telecommunications Dream Project need not end with this publication. The contest worked so well, we encourage you to duplicate it in your own school. Have your students imagine their own Telecommunications Dream Project, write about it, and create their own charts and diagrams -- and you can award your own prizes.

TITLE: International Weather Monitoring Service

STUDENT: David Brussin
TeWinkle Middle School
Costa Mesa, California

DREAM:
- To provide information on the weather to any person or organization in the world
- To base this project in school systems around the world

GRADE: 8

MATERIALS CHECKLIST:
- One computer; modem; printer; telephone line (all at each site); central computer
- Software: database, graphics, communications
- Weather instruments at each school: anemometer, weather vane, thermometer, barometer, moisture sensor, precipitation gauge, and a laser to measure fog/visiblity

TIME REQUIRED: School year

PREREQUISITE STUDENT SKILLS:
- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities
- Ability to read weather instruments

ACTIVITIES AND PROCEDURES:
- Have student groups from each school enter weather data from the past 24 hours into the computer and then use specially-designed weather forecasting software to express past, current, and predicted weather conditions for the general area.
- Have students use their computer and modem (with communications software) to send data and comments on the weather over telephone lines to a computer at a central school.
- After data from all the schools is received by the central school's computer, have students compile and process this information (using database software) to create a world map showing weather conditions in the vicinity of the different schools.
- Include on the map every conceivable weather condition and distribute it by telecommunications to governments, airports, harbors, farmers, recreational facilities, radio operators, law enforcement officers, meterologists, and anyone else who can use it. Allow these individuals to use their own computers (with graphics software) to zoom in to see weather conditions in specific areas and other information.

ADDITIONAL NOTES:

Telecommunications is very important to this project because a large quantity of complex information has to travel at high speeds. This project could become a reality by contacting governments all over the world who would then select schools in their nations to participate in the weather watch. The project could be subsidized in part by charging a small fee for a final weather map. With unlimited funds, equipment and software to translate languages could be installed as well as interactive television. A special satellite could be put into orbit to pinpoint and predict tornadoes. The entire weather watch network could double as an international emergency communication system.

TITLE: International Education Service

STUDENT: Michael Craigen
Smithtown High School East
St. James, New York

DREAM:

- To enable students worldwide to have access to an unlimited source of information
- To enable teachers and students to share information both nationally and internationally

GRADE: 12

MATERIALS CHECKLIST:

- Multiple computers; modems, printers; telephone lines
- Software: word processing, communications

TIME REQUIRED: Ongoing

PREREQUISITE STUDENT SKILLS:

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

ACTIVITIES AND PROCEDURES:

- Establish regional information centers around the world with all information stored by computers. Provide each center with a catalog of the information available in that region, plus listings of all the other centers users may access to find more selective information.
- Link the regional centers by microwave transmission. Since microwave dishes transmit signals in straight lines, it is impossible to link stations around the world; therefore, use satellite transmission to connect the centers as well.
- Have students do research (using word processing and communications software) with school computers linked to a regional center. Let students select from many menus listing the information, programs, or data available to them in other areas. Encourage teachers and students alike to give and receive information such as surveys, programs, and periodicals.

ADDITIONAL NOTES:

Many underdeveloped countries will benefit from this system. The lack of educational materials will no longer be a problem for smaller and poorer countries. Once people in these countries are taught to use the system, many resources of wealthier nations will be available to them. Children will also become more cultured through the use of this system because they will no longer be limited to the information in their immediate environment. This service will be valuable to foreign language students too, as they will be able to communicate directly with people who speak the language they are studying. Language translation software can be used to translate student's responses to the other person's language.

## Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom: STUDENT DREAM PROJECTS

**TITLE:** The Congressional Link

**STUDENT:** Adrienne L. Harvey
Carlton Palmore Elementary
Lakeland, Florida

**DREAM:**

- To create a Congressional Link between the U.S. Congress and U.S. citizens
- To enable people with modems to access Senate and all Congressional meetings
- To enable citizens to find out vital information about their future

**GRADE:** 6

**MATERIALS CHECKLIST:**

- Multiple computers; modems; printers; telephone lines
- Software: word processing, database, communications

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**

- Set up a system so that citizens can find out what laws are passed during any day. Have congressional leaders vote directly from desktop computers so that citizens can find out if taxes are being raised or lowered. Use the system to make available information about how the United States is getting along with other nations.
- Allow reporters to access information--and the President to find out immediately if his proposals are passed or not. Have students study law and how the government works right from their school desks, (using communications and word processing software).
- Most importantly, have senators and representatives ask citizens for immediate advice and opinions.
- Set up the plan as follows: Place a computer (with communications software) at the desk of each representative or senator. These computer should connect to a main computer or telecommunications service (with database software) that allows citizens to access to their representative(s) or senator(s). Allow citizens with modems to (use communications software to) access the main computer or telecommunications service from their personal computer.

**ADDITIONAL NOTES:**

Telecommunications is important to the project because with computers, speed is increased. The information gathered would be more accurate than receiving it from secondary sources. With more money and technology, world governments could be connected so that citizens could access world affairs with just a touch of their fingers to their own desktop computers.

**TITLE:** Creative Use of a Modem

**STUDENT:** Barry Kwartnik
Saint Margaret School
Narberth, Pennsylvania

**DREAM:**

- To provide creative uses of a modem

**GRADE:** 8

**MATERIALS CHECKLIST:**

- Multiple computers; modem; printer; telephone line with unlimited free access
- Software: word processing, graphics, communications

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer, software, and telecommunications

**ACTIVITIES AND PROCEDURES:**

- Establish yourself as an inventor. (My name is Michael Rothenberg and I am Professor of Science at Penn State. I have been studying 7 years on projects using the modem. The school gave me use of the best computer and no limit on the phone bill.)
- Use the modem (and communications software) to contact a friend, or pen pal, who has a modem. Have this person hook a specially-made camera to the main wire of the computer (and load the graphics software). He/she should then stand in front of the camera and push ENTER for it to take a picture. After 11 minutes, watch for a life-size print of your friend to appear on paper in your room. (This can only be used in a 1,000 mile range.)
- Modem use #2: For teenage music lovers, instead of having a human D.J., use a computer D.J. Set up the system so that children can use a computer with a modem to request their favorite song. This would be enjoyable for kids around the world.
- Modem use #3: Use modems for immediate newspaper delivery. When your favorite newspaper is being printed, arrange for it to concurrently come up on your computer screen and for a hard copy to come out of your printer. (This is easier than going to the store to buy a paper. You can wake up with your cup of coffee and your computer printout of the newspaper.)
- Modem use #4: Use modems for grandparents who do not want to go to a rest home. Give them a computer and a modem. When they wake up, have them (use word processing and communications software to) type in that they are awake. Have their whole house hooked up to the computer so you can turn off the lights, open the refrigerator, or turn on the T.V. so grandmother/father doesn't have to wander around the house and hurt him/herself or something.

**ADDITIONAL NOTES:**

Remember how I told you how to print a picture of a person on the printer. Well about 9 minutes ago it took a picture of my assistant and in 2 minutes we'll see if it really works. We're down to 1 minute. I'm getting nervous. I hope it works, 10 seconds. Here we GO! Yes, its working. My assistant is appearing on the printer. I'll probably get the Nobel prize for this.

**TITLE:** Across the World in Two Minutes

**STUDENT:** Kim Ledford
Newton-Conover Middle School
Newton, North Carolina

**DREAM:**
- To talk to students in other countries, e.g., Portugal

**GRADE:** 8

**MATERIALS CHECKLIST:**
- Multiple computers; modem; printer; telephone line
- Software: word processing, communications

**TIME REQUIRED:** School year

**PREREQUISITE STUDENT SKILLS:**
- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**
- Have a computer automatically translate the English language into Portugese, and vice versa, when students use the modem.
- Have students do each other's homework with the computer translating languages.
- Have students talk about each other's countries and discuss things such as religious beliefs, voting rights, what type of government other students have, and how their school system is set up. Have students find out what kind of jobs Portugal has to offer, and how much money the jobs pay.
- Have students talk about what teenagers do in both countries, if they have a certain time to come in at night, and whether they can date or not. Have them find out if they have the freedom teenagers do in the United States.
- Let students teach each other the language of their own countries, not every word, just some of the most frequently used words. Have the computer print both English and Portugese on the screen.
- Encourage students to find out what the environment is like in Portugal: Does the country have cities, or is the country like a village? Do the people trade goods, or do they go to a grocery store to buy their food? Do people have the freedom to go anywhere they please, whenever they want, or are they more restricted? If their government is strict, what can they do and not do?
- Use the modem (and communications software) to make this communication possible. Have students type information into their computer (using word processing software) and save it on diskette. Plug in the modem, load the diskette onto the computer, and then send the information through the modem to Portugal. Ask the teacher there to save it onto a disk to give students the next day.

**ADDITIONAL NOTES:**

Telecommunications is important because it is a lot faster than going to Portugal in person. It would be great for American teachers to go to Portugal and teach the students of Portugal for a week and have the Portuguese teachers come over here for a week. It would be nice if the students could trade countries for a week as well.

## Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom: STUDENT DREAM PROJECTS

**TITLE:** American and Puerto Rican Students Telecommunications Link

**STUDENT:** Marisol Negron
Central High School
Bridgeport, Connecticut

**DREAM:**

- To enable American and Puerto Rican students to get to know each other and learn from each other
- To help Puerto Rican students living in the United States to retain their culture and heritage
- To help all students see the United States as a whole country rather than a country with a separate commonwealth

**GRADE:** 12

**MATERIALS CHECKLIST:**

- Multiple computers; modems; printers; telephone lines, large screen television
- Software: communications, word processing

**TIME REQUIRED:** On-going

**PREREQUISITE STUDENT SKILLS:**

- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

**ACTIVITIES AND PROCEDURES:**

- Establish a telecommunications link between two classes, a Spanish language class in the United States and an English language class in Puerto Rico.
- Choose one student in each class to participate in a telecommunications exchange. Assign each student an essay topic.
- Have those two students each type a paper (using word processing software) on that topic in the language they are studying.
- Have the students send their papers to each other's classrooms using a modem and communications software. Have the student receiving the work correct and return it. Make sure that all students in both classes receive copies of the two original papers, plus the corrected versions.
- Hold a telecommunications conference between the two classes. Have the two students discuss their papers including the corrections and comments. Present the on-line dialog on a giant screen for the entire class to watch.
- Conclude the week by choosing a topic for the following week's paper and selecting two students to write on that topic.

**ADDITIONAL NOTES:**

Telecommunications ensures a "hands-on experience" in learning a language. The real learning would take place during the telecommunications conference because students would have to think in another language in order to carry on a conversation with someone in that other language. The entire class would be learning while this conversation was taking place.

TITLE: Language Project of the Future

STUDENT: Tony Sigmon
Newton-Conover Middle School
Newton, North Carolina

DREAM:
- To communicate with different countries in your own language
- To send information in your own language to another country which would be automatically translated into their language

GRADE: 6

MATERIALS CHECKLIST:
- One computer; modem; printer; telephone line; voice synthesizer
- Software: word processing, communications

TIME REQUIRED: School year

PREREQUISITE STUDENT SKILLS:
- Basic familiarity with the computer and software
- Telecommunications knowledge and capabilities

ACTIVITIES AND PROCEDURES:
- Cooperate with other teachers and develop lesson plans for a spelling or foreign language class.
- Have students take a spelling test using the computer and modem (with communications software). Ask American students to type words (using word processing software). Once the word is typed, have the Russian translation of the word appear on the screen. Have the computer pronounce the word in both languages. Then ask the Russian student to do the same. Use telecommunications to exchange the examinations quickly. Connect as many as four different countries for this spelling test.
- Use this telecommunications/language project to exchange both information and cultural values. Have students ask each other questions like, "What is your favorite food?" Use this activity to encourage students to find out personal things about each other.

ADDITIONAL NOTES:

This project would also help students who are making the transition from a foreign school to an American school or vice versa. Students coming from a foreign school could use a computer that translates words into English or the language of their new country. Students could do their work in their own language and the computer would print it in English. This way teachers would be able to check their work. It would also help new students learn English.

# Computer Learning Foundation® and International Society for Technology in Education Telecommunications in the Classroom

## GUIDE TO LESSON PLANS

| Lesson Plan Title | Author | Lesson Type: Student Dreams | Online Research | Intro Lessons | Coop Learn | Subject Area: Lang Arts | Math | Sci | Soc Stud | Grade: K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Type of Software Used: Educ Game | Word Process | Data base | Spread-sheet | Graphics | Desktop Pub | Comm | Other Software | Page No. |
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# Services, Networks, and Projects

This chapter lists a wide range of choices for educational computer communication services, electronic networks, and exploratory projects. The purpose of this list is not only to provide you with some practical resource information, but also to give you a feel for the kinds of things that are already being done in schools around the country and around the world.

This kind of information is constantly changing. Nearly all of the entries have been verified with the providers, but some of the data was incomplete and the facts change often. Exact costs are left out. You are encouraged to seek further information on the services, and make your own careful comparisons. The Special Interest Group for Telecommunications (SIGTel) of the International Society for Technology in Education (ISTE) plans to publish an annual directory of services with complete information, including costs. For information write to: ISTE SIGTel, 1787 Agate Street, Eugene, OR 97403.

## Special Interest, Local Area, or Limited Access Services

Participation is for those with special interests, in certain local areas, or those who are invited.

*Accu-Data*
619 W. College Ave.
State College, PA 16801
Ph. 814/234-9601

A complete weather database from Accu-Weather, the largest private weather service in North America. Available data includes: hourly surface observations, digitized radar pictures, upper air data, National Weather Service hourly reports, forecasts, severe weather bulletins, marine data, and more. Curriculum materials are available. A special program, "The Accu-Weather Forecaster" software for Macintosh computers is available from a third party.

*Apple Global Education Network*
20600 Mariani Ave. MS 42C
Cupertino, CA 95014
Ph. 408/949-1263

An international project conducted on Apple Link. Teachers from all over the world will share problems and solutions, and student projects will enhance understanding of the global community. The first stage will begin in October, 1989.

*BreadNet*
1729 35th Street N.W., #7
Washington, D.C. 20007
Ph. 202/333-6921

Links teachers, students, and associates of Middlebury College's Bread Loaf Program (a summer writing, literature and theater program) during the school year. Lets teachers stay in touch with colleagues, conduct classroom research projects, and encourage writing. Schools communicate with Apple Link and other networks. The purpose of the project is to help people become better writers.

*Cleveland Free-Net*
Society for Public Access Computing
Box 1987
Cleveland, OH 44106
Ph. 216/368-5121

Available free to the Cleveland community, it provides information about cultural events, city databases, educational exchanges and conferences with community leaders. Also includes special interest group forums, on-line medical and dental information, and an " electronic schoolhouse." Operated by Case Western Reserve University.

*Interactive Communication Simulations*
School of Education
University of Michigan,
Ann Arbor, MI 48109-1259
Ph. 313/763-6716

A conferencing network that provides role-playing games, primarily for junior and senior high social studies. Students from 11 countries participate and assume roles in simulations such as the Arab-Israeli conflict or the US Constitutional Convention.

*Learning Link*
356 W. 58th Street
New York, NY 10019
Ph. 212/560-6613

The Learning Link National Consortium is a network of regional information systems which operates from individual PBS stations and state departments of education. Each regional system provides text-only information in the form of databases, bulletin board discussions, and e-mail. Most of the data is customized for regional use. The information can be useful to a variety of audiences interested in educational technology. Access is usually through local or toll-free calls. Costs range from no charge to a yearly flat rate.

*NYCENET*
Manhattan Technical Assistance Center
122 Amsterdam Ave.,
New York, NY 10023
Ph. 718/935-4020

New York City Educational Network provides a bulletin board, on-line curriculum guides, an on-line encyclopedia, a database of software titles, other databases, and real-time conferencing. Satellite access is being developed.

*New York State/Moscow Telecommunications Project*
Copen Foundation
357 Hunterbrook Road
Yorktown Heights, NY 10598
Ph. 914/962-5864

Connects ten schools in New York with ten in Moscow. The focus is on problem solving and sharing information. Students communicate by computer, telephone, and videophone. The US and Soviet teachers designed the curriculum jointly in Moscow.

*PeaceNet — Institute for Global Communications* (IGC)
3228 Sacramento Street,
San Francisco, CA 94115
Ph. 415/923-0900

A computer network for the world's peace movement, enabling users in over seventy countries to communicate through e-mail, conferences, databases, and a user directory. Conferences address issues such as Star Wars, Central America, and Soviet relations. EcoNet, a network on ecology, is also sponsored by the IGC. Costs include a signup fee, connect time charge, and a monthly minimum.

*SpaceLink*
Marshall Space Flight Center
Huntsville, AL 35812

A computerized information access system for educators, it includes information on NASA programs, aeronautics, classroom materials, and NASA educational activities. Modem number: 205/895-0028. One-way messages may be sent to NASA when you log off. There are no connect charges, but it's a toll call if you don't live in Huntsville.

*SpecialNet*— GTE
2021 K Street NW
Suite 215, Washington, DC 20006
Ph. 202/835-7311

Through this network designed by and for education professionals, users have access to over 3,000 school districts throughout the USA and nearly 50 national information resources/bulletin boards on key topics of interest to administrators, teachers, and academics in the field of special education. Updates are available on Federal activities, policy information, litigation data, parent programs, and other programs of special interest to educators. The network also provides for data collection on students, specialized databases, and private databases.

## Database and News Services

*BRS Instructor*
1200 Rte. 7
Latham, NY 12110
Ph. 800/227-5277

Access to seventy popular databases, such as Magazine Index, newspaper index, and others. Support includes books and transparencies.

*Campus 2000* — TTNS
P.O. Box 7
200 Gray's Inn Road
London WC1X8EZ

A communications and information service for educators, students, and administrators. Services include international e-mail, databases of national and local information, a noticeboard, and conferencing. Activities include "newsday," learning activities designed for use with on-line databases, exam practice, and mock elections. Accessed through Dialcom via Tymnet in the United States.

*Classmate — Dialog Information Services*
3460 Hillview Ave.
Palo Alto, CA 94304
Ph. 800/334-2564

Introduces elementary, secondary, college, and graduate students to on-line information retrieval. Users have access to 85 general interest databases focusing on full-text news and magazines, general science, social studies, and the humanities. Access is through a simplified command language or a menu. Curriculum materials include workbooks, teacher guides, activity masters, transparencies, readings, lecture notes, and a video. No subscription fee or monthly charge, just connect time. The phone call is free.

*Dow Jones News/Retrieval*
Box 300
Princeton, NJ 08540
Ph. 800/257-5114

Allows access to 44 databases of business and financial information. Also general news, weather, movie reviews, and an encyclopedia. Educational material and a tutorial are available.

*Einstein — Learning Link*
Educational Broadcasting Corporation
356 W. 58th St.
New York, NY 10019
Ph. 212/560-6868

A service for secondary schools, with access to over 70 databases, including an encyclopedia, ERIC, abstracts, and MLA Bibliography.

*Networking and World Information*
333 East River Dr.
East Hartford, CT 06108

A news and information service with general world reports, financial news, and business news. Also provides conferencing and e-mail. The primary audience is non-profit organizations and foundations. No signup fee, connect charges based on hourly use.

*News Access — NSBA Lock Box Operations,*
P.O. Box 17316
Baltimore, MD 21203
Ph. 703/838-6722

A joint project of Cable Network News and the National School Board Association. The project is centered around the TV program, "Week in Review" on CNN. Schools can capture the program on videotape, and a Classroom Guide to the program arrives via e-mail each week. A bulletin board invites dialogue between the users and the designers of the project. The annual fee includes video and print duplication rights. CompuServe access is a separate cost.

*News Net*
915 Haverford Road
Bryn Mawr, PA 19010
Ph. 800/345-1301

A full-text database of business information including over 300 industry newsletters and wire services. Eight sources of information about education are on the list, as are more than thirty on electronics and computers and more than sixty on telecommunications. Charges vary; inquire about rates for college classes.

## Messaging (Conferences and Electronic Mail)

*BITNET — EDUCOM*
1112 Sixteenth Street NW
Suite 600
Washington, DC 20036
Ph. 609/520-3374

An international computer-to-computer communications network for higher education and research, it ties together a broad spectrum of users across most disciplines at several hundred universities in the USA. It is directly linked with similar networks in Canada, Europe, and the Far East. Costs for using the network are covered by the organization's membership fee so individual users see no direct cost. Access is available from other networks via gateways. BITNET is merging with CSNET to form ONEnet, which will continue to provide the services of both.

*Electric Pages — GTE*
2021 K. Street NW
Suite 215
Washington, DC 20006
Ph. 202/835-7311

Designed to help national, regional and local organizations create, run and manage their own network. Provides software for e-mail, on-line information, bulletin boards, unattended operation, and file transfer.

*Unison Telecommunications Service*
2174 Seymour Avenue
Cincinnati, OH 45237
Ph. 800/331-6122

A large network primarily designed for the exchange of e-mail. A special feature is the ability to exchange mail with more than 25 other on-line systems. Unison's Education Network allows educational organizations to build private information and conferencing networks. Annual fee, hourly access charges.

*The Well*
27 Gate Five Road
Suite 65G
Sausalito, CA 94965
Ph. 415/332-4335

A conferencing network, including a group on education. Electronic mail is also available. Monthly fee plus hourly connect charges.

## Videotex

Commercial services that deliver text and graphics information for the mass market in a user-friendly environment.

*Minitel USA*
1700 Broadway, 25th floor
New York, NY 10019
Ph. 212/307-5510

Provides information and entertainment on line. Includes shopping, news, databases, e-mail, and other services. Local access in 150 cities. Charged by connect time.

*Prodigy*
445 Hamilton Ave.
White Plains, NY 10601
Ph. 914/993-8000

Created by Sears & Roebuck and IBM, it provides information on weather, consumer news, general news, and sports, e-mail, grocery and other shopping, educational information, banking and brokerage services, travel services, entertainment, and on-line experts. Flat monthly fee, local access.

*Videotel*
5555 San Felipe
Suite 1200
Houston, TX 77056
Ph. 713/840-9777

Enables users to receive text and graphics information through a compact terminal that plugs into a telephone jack. Also accessible via personal computer. Services range from news and financial data to educational courses, entertainment, and home shopping.

## Cooperative Projects

Grass-roots, nonprofit networks of volunteers with common interests and goals. Often funded by grants and donations.

*Computer Pals Across the World*
4974 SW Galen
Lake Oswego, Oregon 97035
Ph. 503/635-0338

An international network designed to connect schools around the world through e-mail. Projects conducted on line include an Across the World Writing Project, teleconferences and simulations. The project holds an international conference each year. The network is accessed through Dialcom.

*FrEdMail Project*
San Diego County Office of Education
Linda Vista Rd.
San Diego, CA 92111
Ph. 619/292-1816

A free educational messaging network, FrEdMail joins 70 cooperating local bulletin boards. The coordinators of each board work together in a system-wide conference and all participants are asked to contribute to the activities of the network. There are two network-wide open conferences: an IDEAS exchange for teachers and KIDWIRE, a bulletin board to post student work. Software and connect time are free, but toll calls are necessary if there's no local bulletin board.

*Project Orillas*
Yale University
P.O. Box 11-A
New Haven, CT 06520

The goal of Project Orillas is to promote Spanish language literacy by providing a motivated context for writing. Writing materials are designed to investigate the interaction of speaking and writing. Includes teachers in bilingual, ESL, and foreign languages in a number of nations. The choice of network for e-mail is determined by sister classes. Cost depends on the chosen network.

## General Purpose Information

Commercial networks offering full-service computer communication.

*AppleLink Personal Edition*
8619 Westwood Center Drive
Vienna, VA 22180
Ph. 800/545-5047

An on-line service for the Apple community, it provides e-mail, a bulletin board on current updates for Apple users, conferencing, an extensive reference library on product and technical Apple information, access to an on-line encyclopedia, and guest speakers. The Tutoring Center provides access to study materials and courses. Annual fee and hourly connect charges.

*BIX*
One Phoenix Mill Lane
Peterborough, NH 03458
Ph. 800/227-2983

BIX, The Byte Information Exchange, is run in conjunction with Byte magazine. It provides conferences, vendor support, access to experts, daily updates on the computer industry, databases on products and systems, and public domain software. Access is through Tymnet. Annual or quarterly fee, plus Tymnet time.

*CompuServe*
5000 Arlington Centre Blvd.
P.O. Box 20212
Columbus, OH. 43220
Ph. 800/848-819

An information service, provides on-line access to news, financial services, travel reservations, forums, live conferences and help with your computer and telecommunications software. Educational issues are discussed in a variety of conferences in the Education Forum. There is an extensive e-mail system and on-line shopping "mall." Signup fee and hourly connect charges. Premium services at added cost.

*Delphi*
Three Blackstone Street
Cambridge, MA 02139
Ph. 800/544-4005

Provides e-mail, encyclopedia, news, games, shopping, groups and clubs, and travel information. Members from over forty countries. Signup fee and hourly connect charges.

*GEnie*
Box 02B-C
401 N. Washington Street,
Rockville, MD 20850
Ph. 800/ 638-9636

Provides access to information and services relating to finance, travel, news, reference (including an encyclopedia), shopping, computing, and entertainment. Electronic mail is provided and RoundTable special interest groups, including one on education, are used for conferencing. Signup fee and hourly connect charges. Extra fee for some services.

## Educational Projects

These commercial services organize and provide frameworks for students to conduct educational projects.

*Kids Network*
National Geographic Society
17th & M Sts.
Washington, DC 20036
Ph. 202/775-6580

The goals of this program are to increase active learning, to improve problem solving, and to encourage cooperative scientific investigation. Consists of a series of units with print materials and software for use on the Apple IIGS. Curriculum units are designed to use databases and telecommunications. Topics include acid rain, weather, water quality, and an introduction to telecommunications. One charge covers software, print materials, support, and connect time.

*LDLN — AT&T*
P.O. Box 716
Basking Ridge, NJ 07920-0716
Ph. 800/367-7225, ext. 4158

The Long Distance Learning Network (LDLN) offers curriculum-based educational projects where technology plays an essential, but not highly visible role. Electronic mail is sent and received with specially tailored software. "Learning circles" made up of 6-9 classrooms exchange and discuss student work for a set period of time, then cooperate to publish a report of their work. A single subscription rate covers membership in a learning circle, all access costs, a curriculum guide, a tutorial disk, software, technical support, and a newsletter.

*TERC Star Schools Project*
1696 Massachusetts Avenue
Cambridge, MA 02138
Ph. 617/547-0430

Uses telecommunication to engage scientists and mathematicians in grades 7-12 in large-scale, cooperative investigations. Findings are shared among students and professional scientists across the country. All classes receive an introduction to the network and the concept of collaborative investigation, then they select one or more modules and participate in a four-week core investigation. Module topics include: polling, design, radon, weather, patterns for iteration, trees, and tides. Funded by the federal Star Schools Program. No charge to schools that are accepted.

## Courses and Instruction

Courses and on-line education at the school or college level.

*Home Network*
Office of Instructional Tech., U. of Delaware
Newark, DE 19716
Ph. 302/451-8161

Sponsored by the University of Delaware, it is designed for home users to access educational software available on the PLATO system. Lessons are available for children in math, reading and logic. Adults have 192 courses to choose from including agriculture, biology, chemistry, computer science, English, nursing and psychology. A bulletin board is also available to the users along with a variety of educational and recreational games. Signup fee and hourly connect charges.

*Connect Ed*
Connected Education
92 Van Cortlandt Park South #6F
Bronx, NY 10463

Delivers graduate courses on line. (No more details available at press time.)

*The Virtual Classroom*
Computerized Conferencing and Communications Center
New Jersey Institute of Technology
Newark, NJ 07102

Funded by the Annenberg/CPB Project, this service delivers college level courses on line. Specially designed computer software links the student to professors and classmates. The student registers for the course, attends classes, and takes tests on line. An integral part of the project is research into the efficacy of on-line learning. The system software operates in the UNIX environment and is available for lease. A limited number of accounts are available for a fee.

## Networks Outside the USA

Ireland's National Information Technology in Education Centre is developing a teacher-based electronic network to support new information technologies in schools across the country. The *NITEC NETWORK* will provide teachers with services to download software and obtain software evaluations, guidance, and occupational information. Assistance will be available on line from software authors.

Services in Sweden include bibliographic databases where teachers and students can obtain references to Swedish newspapers and journals, economic and statistical databases, full text copies of selected articles from recent publications, and electronic conferencing through SkolKOM.

*Pluto* is a European network for teacher education supported in part by IBM. It provides communications and information services to educators in teacher training institutes. The project is also designed to help teachers develop the skills needed to effectively use electronic networking and on-line resources for instructional purposes.

*Network Inter-Action* is a pilot communications project designed to network youth clubs and schools around the United Kingdom. Participants will gain organizational skills, learn about computers and communication technology, exchange ideas and access databases. An international version is being explored.

Japan's *TWICS* offers e-mail, courses, and conferences, and publishes a quarterly newsletter. Access is through local phone numbers or international gateways. TWICS runs in cooperation with a private educational program that teaches English and other subjects. Most information is delivered in English and some in Japanese. Their address is IEC/TWICS, 1-21 Yotsuya, Shinjuku-ku, Tokyo 160, Japan.

# Resources

*The Bulletin Board Directory of North America*
Christopher Fischer, editor. Published quarterly.
P.O. Box 4150, Vero Beach, FL 32964.

*C.A.L.L. Digest*, Special Issue on Telecomunications for Language Teachers and Learners, Vol. 3, No. 5, 1987.

*The Complete Handbook of Personal Computer Communications* (Revised and Updated)
by Alfred Glossbrenner. St. Martin's Press, 1985.

*The Computing Teacher*
Special Telecommunication Issue, May 1988.
Regular column on telecommunication.

*Essential Guide to Bulletin Board Systems*
by Patrick R. Dewey. Meckler Publication 1987.

*Hooking In: The Underground Computer Bulletin Board Workbook and Guide*by Beeston and Tucker. Computerfood Press.
P.O. Box 608, Oracle, AZ 85623

*Modems, Methods, and Magic: A Guide to Telecommunications for Educators.*
Bernie and June Dodge. Franklin, Beedle & Assoc. (To be published in 1990)

The "Plumb" Newsletter, Ric Manning, editor.
Riverside Data,P.O. Box 300, Harrod's Creek, KY 40027.

"Selecting Telecommunication Software for Educational Settings" by June and Bernie Dodge, *The Computing Teacher*, April 1987 pp. 10-12.

"Telecomputing: How to Overcome the Roadblocks," by Len Scrogan, *Classroom Computer Learning*, February 1987, pp. 40-45.

"Teleconferencing: A New Way of Communicating for Teachers and Kids," *Classroom Computer Learning*, March 1987, pp. 37-42.

# Glossary

**Access** refers to the ability to send or retrieve information

**ASCII** is the American Standard Code for Information Interchange. It is a method of representing the 96 standard print characters and some format codes in format recognized by different computers.

**Baud rate** is the speed at which telecommunications data is transmitted. The rate is measured in bits per second. The most common baud rates are 300, 1200, and 2400.

**Buffer** is a "holding area" of computer memory set aside for temporarily storing information received while on line. The information may be later sent to a printer or disk.

**Bulletin Board System** (BBS) is a computerized system for reading and leaving messages via computer. It is sometimes a small-scale, local electronic network that includes space for the public to leave messages. Some bulletin board systems include space for storage of data files.

**Carrier** (communications common carrier) refers to the telephone connection made with another computer.

**Carrier service** refers to the electronic network service that enables you to connect to a distant host computer by dialing a local number. This service is also called the packet switching network and includes services such as Telenet, Tymnet and Dialcom.

**Commercial Database Services** are database services with national/international networks that offer a large number of searchable databases for a fee. Examples of these services are DIALOG, BRS and NewsNet.

**Communications** satellites are used for telecommunications including telephone, computer, radio, television and other forms of communication as they speed delivery of data across large distances.

**Communications software** is the software that provides the computer with the directions for transmitting and receiving messages over a phone line.

**Conference** refers to communication between two or more individuals. (Teleconference is over a long distance.) These terms may have different meanings in different contexts.

**Connect time** is the time you are on line on a network. It is usually divided into prime and non-prime times. You are charged for the connect time from the minute you sign on. Connect time rates are usually per hour.

**Control characters** are special keystroke combinations used to control printer formats and other special purposes. They are often embedded in text but not visible on the screen. These characters can interfere with telecommunications so they are often removed before data is transferred. The removal of these characters will usually remove the formatting and it will have to be reestablished after the transfer.

**Dedicated telephone line** is a phone line specifically used for telecommunications. The use of a dedicated line eliminates interruption of data transmissions.

**Download** means to receive a whole file from another computer (e.g. a BASIC program from an on-line service)

**Dump** means to move information from memory to a diskette or a printer (e.g., printing a graphic or saving buffered data to disk)

**Duplex** is the two-way communications method that allows simultaneous transmissions (full duplex) or alternating transmissions (half duplex). The standard is full duplex.

**Electronic mail**, referred to as e-mail, is messages sent electronically. Most electronic mail systems simulate the way mail is usually handled with capabilities such as sending mail, reading mail, forwarding mail, copying mail, saving mail and writing or editing mail. Sending and receiving mail electronically often requires an I D number and password access to the mail system.

**Emulation** occurs when a computer or terminal acts like another kind of computer or terminal. This type of emulation is usually done using a software package which enables a computer to act like a terminal connected to a mainframe.

**File** means a set of associated data identified by a name.

**Gateway** refers to a computer that is a switch to another host computer. Common gateways are Tymnet, Telenet, Dialcom and Internet.

**Handshake** is a protocol or ritual two computers go through before they can communicate.

**Host** refers to the computer, usually a mini or mainframe, that stores information and/or facilities for telecommunications. It is also called the "system" or the "network". Members access the host by personal computer, modem, and telephone line.

**Information utility** is a system that provides you with electronic information via computer. Examples are included in the directory of telecommunications services.

**Interface cable** is a wire that connects a device such as a modem to a computer.

**Macros** are a way to give commands to the computer with a few keystrokes instead of many. Most communications software havethe capability to use macros to dial the network and log on.

**Menu** is a list of choices that come up on the screen so that programs are run by selecting a topic from the list and/or sublists.

**Message board** is the area on the network where you post messages that are stored on the system for reference.

**Modem** is an acronym for MODulator/DEModulator. This is the hardware that allows a computer to transmit and/or receive data over phone lines. It is used to convert computer signals to phone signals and the reverse. The modem may be internal or external to the computer.

**Network** means a series of interconnected points. This term can be extremely vague. Avoid using it alone!

**Noise** or garbage is static on the phone lines which may cause undesired characters to be sent or received by your computer.

**Off-line** refers to performing an operation with a computer while not connected to a telecommunications network.

**On-line** refers to using the computer when it is connected to another computer.

**Parallel** refers to the process of transferring data when all data bits of a unit of information-such as a character are sent simultaneously, with a wire transmitting each bit.

**Parity** is an error-detection system that adds a bit of data to a binary word to indicate whether the binary number is even or odd. Parity is used to spot when data may have been incorrectly communicated.

**Protocol** refers to the rules established by a computer system to transmit data. The protocol must be the same on for the sending and receiving computer. Common protocols are Xmodem, Yterm, and Kermit.

**Real time** or synchronous refers to communication between two or more people that occurs while they are on line simultaneously.

**RS-232, RS-232-C** are the standard cable type used by modems.

**Serial** refers to sending data bits one after another through a single wire.

**Special Interest Groups**, or SIGs, are areas on telecommunications networks that provide messages, conferencing and storage for a conference for use by members who share a particular interest. These groups are given various names on different networks such as Round Tables, Conferences, Forums, and Centers.

**SYSOP** is an acronym for SYStem OPerator, the person who manages a bulletin board, "conference" or interest group.

**Telecommunications** is the transmission of signals from computer to computer over long distances using telecommunications facilities such as phone lines, satellites and/or microwaves.

**Teleconferencing** refers to a "conference" via telephone using a computer. A teleconference allows users to hold conversations in an interactive or "talk" mode or a message mode. Multiple users can participate in a teleconference.

**Terminal mode** refers to the situation in which a computer is sending or receiving information from another computer, rather than processing information.

**Text file** means a file made up of standard ASCII characters (numbers, letters, punctuation) that can be understood by virtually any computer.

**Upload** refers to transferring files created on one computer to a another computer.

**Xmodem** is a protocol or system program to send and receive files without errors. Other protocols include Kermit and Yterm.

**XON-XOFF** is a signal sent by one computer to another to indicate when to wait for data and when to start to transmit data.

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